

The Mining Journal

RAILWAY AND COMMERCIAL GAZETTE

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

[The Mining Journal is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.]

No. 2210.—VOL. XLVII.

LONDON. SATURDAY, DECEMBER 29, 1877.

WITH
SUPPLEMENT. PRICE SIXPENCE.
PER ANNUM, BY POST, £1 4s.

MR. JAMES H. CROFTS, STOCK AND SHARE BROKER,
AND MINING SHARE DEALER.
NO. 1, FINCH LANE, CORNHILL, LONDON, E.C.
ESTABLISHED 1842.

BUSINESS transacted in all descriptions of MINING Stocks and Shares (British and Foreign), Consols, Banks, Bonds (Foreign and Colonial), Railways, Miscellaneous, Insurance, Assurance, Telegraph, Shipping, Canal, Gas, Water, and Dock Shares.

BUSINESS negotiated in Stocks and Shares not having a general market value.

BUSINESS in COLLIERY and IRON Shares, and in the principal WAGONS and MANUFACTURING COMPANIES of the NORTH of ENGLAND and SCOTLAND.

BUSINESS in all the principal COTTON SPINNING SHARES.

MR. J. H. CROFTS, having now established CORRESPONDING AGENCIES in all the CHIEF TOWNS of the United Kingdom, is prepared to deal in the various LOCAL Stocks and Shares at close market prices.

ACCOUNTS OPENED FOR THE FORTNIGHTLY SETTLEMENT.
A Daily Price List, issued at 5 p.m., giving latest Quotations up to close of Market. Also, on the 1st of every month List of all Securities currently dealt in upon the Mining and Stock Exchanges, with latest prices, current dividends, rate of interest yielded at market price, &c., and every Friday a general List containing closing prices of the week.

MINES INSPECTED.
BANKERS: CITY BANK, LONDON; SOUTH CORNWALL BANK, ST. AUSTELL.

SPECIAL DEALINGS in the following, or part:—
10 Great Laxey, £22 1/2.
20 Bodidris.
50 Belstone, 2s. 6d.
40 Chapel House, £2 1s 3 1/2.
50 Chontales, 11s. 9d.
50 Combar Martin, 3s.
20 Derwent, £1 1s. 6d.
30 Devon Cons., £2 1/2.
10 East Van, £3 1/2.
50 Exchequer, 5s.
35 Frontino, £2 2s. 9d.
25 Flagstaff, 20s.
10 Gorseid & Mer., £5 1/2.
20 Grogwinion, £4 1/2.
20 Glym., 9s. 6d.
20 Glensay, 20s.
10 Great Laxey, £22 1/2.
10 Great Laxey, £22 1/2.
10 Herodfoot.
10 Holmbush.
100 Javali, 7s. 6d.
20 Last Chance, 17s.
20 Leadhills, £4 1s. 3d.
50 Llanrwst, 2s.
20 Ladywell, 21s.
10 Llan Gau, £3 1/2.
15 Marke Valley, 17s.
10 Minera, £15 1/2.
20 N. Quebrada, £2 5s.
50 North Laxey, 6s. 9d.
25 Pandora.
10 Pateley Bridge, £3 1/2.
50 Penfreston, 6s.

** SHARES SOLD FOR FORWARD DELIVERY (ONE, TWO, OR THREE MONTHS) ON DEPOSIT OF TWENTY PER CENT.

BUSINESS also on hand in—Great Holway, Lisburne, New Zealand Kapanga, Pemant, Lovell, St. Patrick, Santa Barbara, West Craven Moor.

D'ERESBY MOUNTAIN (LEAD).—BUSINESS negotiated in these shares.
JAMES H. CROFTS, 1, FINCH LANE, LONDON.

TIN SHARES—SPECIAL BUSINESS at close prices in Carn Brea, Cook's Kitchen, Dolcoath, East Lovell, South Condurrow, Tincroft, Wheal Agar, Peveril, Greville, Uny, Wheal Kitty, and others.

JAMES H. CROFTS, 1, FINCH LANE, LONDON.

FOREIGN BONDS—ARGENTINE—EGYPTIAN—RUSSIAN, TURKISH, SPANISH, PERU, &c.

SPECIAL BUSINESS in the above, and Fortnightly Accounts opened on receipt of the usual cover.

JAMES H. CROFTS, 1, FINCH LANE, LONDON.

RAILWAYS—HOME AND FOREIGN.—SPECIAL BUSINESS in the above, and Fortnightly Accounts opened on receipt of the usual cover.

JAMES H. CROFTS, 1, FINCH LANE, LONDON.

MISCELLANEOUS AND TRAMWAY SHARES.—SPECIAL BUSINESS in—

10 Alabrama, £3 17s. 6d.
10 Brighton Aquarium, £10 3/4.
4 Charing Cross Hotel.
20 Devonport & Tiverton Brewery.
10 Fore-street Warehouse, £24 1/2.
10 Halcomb Sack.
10 Hudson's Bay, £10 1/2.
5 Langham Hotel.
25 Lawes Chemical, 27 s. 6d.
Business TRANSACTED in all MISCELLANEOUS SHARES (of whatever description) having LONDON or COUNTRY MARKET VALUES.

JAMES H. CROFTS, 1, FINCH LANE, LONDON.

BANKERS: City Bank, London; South Cornwall Bank, St. Austell.

ESTABLISHED 1842.

MR. W. H. BUMPUS, STOCK AND SHARE BROKER,
AND MINING SHARE DEALER,
44, THREADNEEDLE STREET, LONDON, E.C.
ESTABLISHED 1867.

BUSINESS transacted in MINING and COLLIERY Shares of every description, English and Foreign Stocks, Colonial Government Bonds, Railways, Banks, and Miscellaneous Shares, and all Securities dealt in on the London Stock Exchange, for INVESTMENT or SPECULATION.

Purchases and Sales negotiated in Unmarketable Stocks and Shares.

Speculative Accounts opened for the Fortnightly Settlement.

References given and required when necessary.

Stock and Share List forwarded free on application.

MR. BUMPUS has SPECIAL BUSINESS in the undermentioned:—

10 East Van, £3 1/2.
50 East Caradon.
10 Frontino, £2 11s. 3d.
50 Glenroy, 18s. 6d.
20 Gorseid, £5 1/2.
25 Hultafall.
30 Cedar Creek, 5s. 9d.
50 Chontales, 13s.
15 Devon Cons., £3 8s 9
10 Derwent, 36s.
10 Don Pedro, 7s. 6d.
35 Eberhardt, £8 11s. 3d.
40 Exchequer, 5s. 6d.
20 East Lovell, 18s.

DEVONPORT AND TIVERTON BREWERY COMPANY.—Mr. BUMPUS can supply a limited number of these shares on advantageous terms to cash purchasers.

The following Shares are worth buying for a rise, viz.:—WHEAL GREENVILLE, HULTAFALL, ROOKHOPPE, SOUTH FRANCES, and PARYS MOUNTAIN.

SPECIAL BUSINESS, at close prices, in the SHARES of all the principal HOME and FOREIGN MINES.

WILLIAM HENRY BUMPUS, SWORN BROKER.
Offices: 44, Threadneedle Street, London, E.C.
BANKERS—THE NATIONAL PROVINCIAL BANK OF ENGLAND, E.C.

WILLIAM B. COBB, STOCK AND SHARE DEALER,
62, CORNHILL, LONDON, E.C.
BANKERS: The Alliance Bank (Limited).

FERDINAND R. KIRK, STOCKBROKER,
5, BIRCHIN LANE, E.C.,

The following are likely to go HIGHER:—Port Phillip, Parys Mountain, Pemant, London and California, Sierra Buttes, Don Pedro. Business in all as Buyer or Seller.

OFFERS WANTED FOR—20 South Roman Gravels, 30 Yarmouth Aquarium. BUSINESS IN—Cardiff and Swansea, Bilsom and Crump, Chapel House, Altami, Newport Abercarn, Thorp's Gawber, Llanrwst, Pateley Bridge, Pandore, Plumas Eureka, Kapanga, Royal Aquarium, Linares, Cape Copper, Leadhills, and Don Pedro.

MESSRS. PETER WATSON AND CO.,
54, OLD BROAD STREET, LONDON, E.C.
BUSINESS in STOCKS and SHARES.

RAILWAYS, BANKS, DIVIDEND LEAD MINES, &c.
BANKERS: THE ALLIANCE BANK (Limited).

A CIRCULAR published MONTHLY. Single Copy, 6d.; Annually, 5s.

MR. ALFRED E. COOKE,
STOCK AND SHARE DEALER,
76, OLD BROAD STREET, LONDON, E.C.
ESTABLISHED 1853.

DAILY PRICE LISTS of all STOCK EXCHANGE SECURITIES and MINES ready at 5 p.m., and forwarded to applicants.

INVESTORS' GAZETTE, published every FRIDAY EVENING in time for post, sent on receipt of postage stamp.

AN INVALUABLE PUBLICATION.

CORNISH SHARES AND THE METAL MARKET, TANKERVILLE, ROMAN GRAVELS, HOLMBUSH, NORTH LAXEY, HULTAFALL, RICHMOND, &c. Read the "INVESTORS' GAZETTE," published last evening, and EVERY FRIDAY EVENING. Post free for three months, 2s. 6d.

Edited by ALFRED E. COOKE.

COOKE'S MONTHLY INVESTMENT LIST, published on the FIRST of EVERY MONTH, price 6d. each copy.

THE MOST NOVEL and CONVENIENT LIST EVER ISSUED.

ALFRED E. COOKE, STOCK AND SHARE DEALER,
76, OLD BROAD STREET, LONDON.
ESTABLISHED 1853.

MR. JAMES STOCKER, STOCK AND SHARE BROKER,
AND MINING SHARE DEALER,
2, CROWN COURT, THREADNEEDLE STREET, LONDON, E.C.
[Established 1848.]

BUSINESS in all kinds of STOCK EXCHANGE SECURITIES, BRITISH and FOREIGN MINING, COLLIERY, MANUFACTURING, and other SHARES.

SPECIAL BUSINESS in the following:—RAILWAYS—Caledonian, Metropolitan, Brighton, and Great Eastern.

FOREIGN BONDS—Russian, Turkish, Spanish, Egyptian, and Peruvian.

TELEGRAPHS—Anglo-American, Brazilian Submarine, Eastern, and Globe.

BRITISH and FOREIGN MINES:—

Derwent, 35s. 9d.
Pandora, 12s. 6d.
East Van, £3 1/2.
Parys Mountain, 9s. 9d.
Grogwinion, £4 1/2.
Frontino, 20s. 6d.
Glym., 9s. 6d.
Gorseid and Mer., £5 1/2.
Hington, 5s.
Holmbush, 32s. 6d.
Leadhills, 24s.
Llanrwst, 35s.
Marke Valley, 16s. 6d.
North Laxey, 6s. 6d.
Cambrian, Carn Brea, D'eresby, Devon Consols, Dolcoath, Lovell, Miners, Tin-croft, Van, Wheal Crebore, Wheal Newton, Argentine, Chicago, Colorado, Don Pedro, I.X.L., Javali, Malabar, South Aurora, Yorke Peninsula.

COLLIERS—Altami, Chapel House, New Sharston, and Thorp's Gawber.

MISCELLANEOUS—Devonport and Tiverton Brewery, Credit Foncier, Diamond Rock, Ebbw Vale, General Credit, Halcombe Sack, Hudson's Bay, National Steam, Native Guano, Tramway, and Aquarium Shares.

BANKERS: LONDON AND WESTMINSTER.

MR. T. E. W. THOMAS, SHARE BROKER,
8, GREAT WINCHESTER STREET BUILDINGS, E.C.
Established 1857.

The following are the latest prices at which business could be done. Where the difference between the buying and selling price is wide transactions may be effected at an intermediate price:—

Buyers. Sellers
Cambrian £2 2s 2 1/2
Chontales 12s. 14s.
D'eresby 50s. 60s.
Derwent 1 1/2s. 2 1/2s.
Devon Great Consols 3s. 3 1/2s.
Dolcoath 33s. 35s.
Don Pedro 6s. 8s.
Eberhardt 8 1/2s. 8 1/2s.
East Caradon 7s. 8s.
East Van 3 1/2s. 3 1/2s.
Exchequer Gold 4s. 6d. 5s. 6d.
Flagstaff 2 1/2s. 3 1/2s.
Frontino 2 1/2s. 20s.
Glenroy 18s. 20s.
Great Laxey 5s. 7s. 8s.
Great Laxey 21 1/2s. 22 1/2s.
Herodfoot 8s. 9s.
Hington 4s. 6s.
Hultafall 4s. 4 1/2s.
Last Chance 15s. 17s. 6d.
Ladywell 17s. 6d. 20s.
Llanrwst 1 1/2s. 2 1/2s.
Leadhills 4s. 4 1/2s.
Miners 217s. 218s.
Marke Valley 15s. 17s.
New Quebrada 2 1/2s. 2 1/2s.
New Zealand Kapanga 7s. 10s.
Parys Mountain 8s. 10s.
Pateley Bridge 3 1/2s. 4s.
Rochdale 8 1/2s. 8 1/2s.
Rookhope 21s. 22s. 6d.
South Condurrow 9 1/2s. 10s.
Tankerville 1 1/2s. 4 1/2s.
Tincroft 12s. 13s.
Van 29s. 30s.
Van Consols 5s. 7s. 8s.
West Chiverton 13s. 14s.
West Pendlebury 1 1/2s. 1 1/2s.
West Tankerville 15s. 20s.
West Wye Valley 3 1/2s. 4s.
W. Grenville 2 1/2s. 3s.
Wheal Kitty 2 1/2s. 3 1/2s.
Wheal Valley 2 1/2s. 2 1/2s.
Yorke Peninsula 5s. 7s. 8s.

N.B.—For the New Year South Condurrow is the best Tin Mine; East Caradon the best Copper Mine; and Roman Gravels the best Lead Mine at present market prices. Investors will do well by acting on this.

JOSPEPH JOHN PYNE,
STOCK AND SHARE BROKER, AND
MINING SHARE DEALER,
6, BISHOPSGATE, LONDON, E.C.

Mr. PYNE having been connected with MINING ENTERPRISE for upwards of FOURTEEN YEARS, and having been a DIRECTOR of MINES in SHROPSHIRE, MONTGOMERYSHIRE, CARDIGANSHIRE, CARNARVONSHIRE, YORKSHIRE, and in VENEZUELA, has had great opportunities of becoming acquainted with this particular branch of industry, and will always be desirous of giving every information in his power to all parties transacting business with him.

ALL DESCRIPTIONS OF SHARES are dealt in, including BRITISH and FOREIGN STOCKS, and RAILWAY SECURITIES.

A DAILY SHARE LIST issued, giving latest quotations up to the close of the market.

AN EXTENDED LIST made up to the first of every month of all securities usually dealt in, giving highest and lowest prices for the month, the current dividends, and when payable, with amount of interest calculated at the present market price. Will be forwarded when desired.

MR. PYNE DOES NOT ISSUE ANY CIRCULAR.

BANKERS—THE ALLIANCE BANK (LIMITED).

MR. W. W. BUMPUS, STOCK AND SHARE DEALER,
29, BISHOPSGATE STREET, LONDON, E.C. (Established 21 Years),
can sell the following SHARES, at prices annexed:—

75 Almada, 6s.
10 Argentine, £2 12s. 6d.
75 Aberdant. 45s. 3d.
25 Birdseye Creek, 17s 6d.
30 Chontales, 13s.
30 Chicago, £2 2s. 6d.
30 Don Pedro, 8s.
30 East Lovell, 18s.
30 Leadhills, £4 11s. 3d.
30 Marke Valley, 16s. 6d.
30 New Zealand Kap., 10s.
30 Devon Cons., £3 5s.
20 Derwent, £2.
15 Eberhardt, £7 10s.
15 Flagstaff, 21s.
15 Glym., 9s. 6d.
15 Great Laxey, £2 17s. 6d.
15 Hington, 7s. 6d.
15 Llanrwst, 35s.
15 Parys Mountain, 9s. 6d.
15 Roman Grav., 7s.
15 Tankerville, £4 7s. 6d.
15 W. Grenville, 5s.
15 W. Wheal Valley, 17s.
15 Yorke Peninsula, 8s. 9d.

20 Hulton, 20s. 6d.
20 Leadhills, 24s.
20 New Zealand Kap., 10s.
20 N. Quebrada, £2 7s. 6d.
20 N. Wheal Valley, 17s.
20 Parys Mountain, 10s.
20 Roman Grav., 7s.
20 Tankerville, £4 7s. 6d.
20 W. Grenville, 5s.
20 W. Wheal Valley, 17s.
20 Yorke Peninsula, 8s. 9d.

25 Last Chance, 17s. 6d.
25 Leadhills, £4 11s. 3d.
25 N. Quebrada, £2 7s. 6d.
25 Parys Mountain, 10s.
25 Roman Grav., 7s.
25 Tankerville, £4 7s. 6d.
25 W. Grenville, 5s.
25 W. Wheal Valley, 17s.
25 Yorke Peninsula, 8s. 9d.

30 East Van, £3 18s. 9d.
30 Great Laxey, £2 17s. 6d.
30 Hington, 7s. 6d.
30 Leadhills, £4 11s. 3d.
30 New Zealand Kap., 10s.
30 Parys Mountain, 10s.
30 Roman Grav., 7s.
30 Tankerville, £4 7s. 6d.
30 W. Grenville, 5s.
30 W. Wheal Valley, 17s.
30 Yorke Peninsula, 8s. 9d.

35 Devon Cons., £3 5s.
35 Eberhardt, £7 10s.
35 Flagstaff, 21s.
35 Glym., 9s. 6d.
35 Great Laxey, £2 17s. 6d.
35 Hington, 7s. 6d.
35 Leadhills, £4 11s. 3d.
35 New Zealand Kap., 10s.
35 Parys Mountain, 10s.
35 Roman Grav., 7s.
35 Tankerville, £4 7s. 6d.
35 W. Grenville, 5s.
35 W. Wheal Valley, 17s.
35 Yorke Peninsula, 8s. 9d.

Lectures on Practical Mining in Germany.

CLAUSTRAL MINING SCHOOL NOTES—No. LVI.*

BY J. CLARK JEFFERSON, A.R.S.M., W.H. SC.,

Certified Mining Engineer.

(Formerly Student at the Royal Bergakademie, Clausthal).

(The Author reserves the right of reproduction.)

SECTION III.

For carrying the Kinatomon drill a patent carriage has been designed. This consists of a low cast-iron frame, or plate, supported on four small wheels. To a horizontal circular plate, pivoted and resting on this frame, a quadrant, the arc of which is provided on the outside with teeth, is attached in a vertical position. The plate and arc can thus be rotated about a central vertical bolt in the carriage. On the centre about which the arc of the quadrant is struck a pair of strong wrought-iron plates are hinged, or centered, and project one on each side of the quadrant, to about twice the length of the radius of the quadrant, the two extreme ends being connected by a strong pin or bolt over which the clamp of the drill is slipped. A small cogwheel is centered on a short cross spindle between the two side plates, or arms, carrying the drill, and gears into the teeth on the quadrant. By means of a handle fitting on the squared projecting end of the spindle the cogwheel can be rotated, thus raising or lowering the arms carrying the drill.

The chief advantages claimed for the Kinatomon are that it is shorter, lighter, and simpler in construction than most other rock drills. It requires the turning of only one instead of a number of set screws to fit it in position at any angle, and it may be fed 3 in. out of stroke without stopping the working of the drill. Its rate of progress in granite, gneiss, whinstone, &c., is said to vary from 3 in. to 1 ft. per minute. The larger machines are constructed to drill up to 3 in. diameter, and a properly tempered steel drill should bore about 10 ft. without requiring re-sharpening. In hard granite, and with a pressure of 45 lbs. to the square inch, it is said a rate of a in. per minute can be relied on.

The next form of rock drill which claims our attention is the Ingersoll, brought out and patented in Europe by Messrs. Le Gros and Silva, of London. The principal characteristics of the Ingersoll drill are that the whole of the motions connected with the machine are performed in an automatic manner, more especially that which concerns the gradual feeding forward of the cylinder as the hole gets deeper; and this takes place and is solely dependent on the previous amount of penetration; so that this rock drill can accommodate its feed to the varying hardness of the rock to be drilled through. And, besides, the stroke of the piston gives a dead blow on the rock, as the steam, or compressed air, is not cut off till after or at the same time as the blow is struck. The construction of the cylinder is such as to give an effective cushioning of steam or compressed air if the piston makes a stroke beyond its regular length, thus preventing the possibility of the piston striking the cylinder covers. The piston is extremely long, about three to four diameters, and the piston rod, which projects through the front cylinder cover, and carries the borer, is about three-fourths the diameter of the piston. The valve is an ordinary slide valve; the valve spindle, however, is worked by a tappet motion, which consists of two very short levers, hinged at their centres, the one arm of which gears against the valve spindle, whilst the other projects slightly within the cylinder. The two ends which project within the cylinder are struck alternately by the piston, thus reversing the valve, and bringing each tappet successively forward into position to be struck by the piston. In a recess formed at the lower end of the cylinder on the opposite side to the valve chest is a third tappet, centred on a spindle, which passes steam tight through the cylinder, and carries on its end outside the cylinder a second short lever, or tappet, which hangs in a vertical position. This outside tappet is held between a small fork, attached horizontally to a long vertical spindle passing upwards. The tappet inside the cylinder after being struck by the piston is brought back into position by a small spring, thus giving the vertical spindle a partial reciprocating rotatory motion. At the upper end of this vertical spindle a horizontal arm carries a pawl, which works in a ratchet wheel, or collar, attached to the top cylinder cover, which is tapped, and forms a nut through which the feed screw passes; this latter being attached by means of a collar to a curved arm or bar bolted to the head of the frame. The end of the screw is filed square, so that a handle or winch can be slipped over the end, and in this manner the cylinder borer, &c., readily withdrawn from the bore hole when it is required to change for a fresh borer, &c. The frame which carries the cylinder, and to which the strap for carrying the feed screw is bolted, forms a semi-cylindrical or semi-ellipsoidal shell, provided with internal V-shaped projections, which fits into corresponding external grooves on the cylinder. The tappet for actuating the feed motion is placed about 3-16ths of an inch nearer the front end of the cylinder, so that if the penetration of the drill is less than this distance between the feed and the lower valve tappet the piston fails to strike the feed tappet, and no further forward motion of the drill takes place. The gradual rotatory motion of the borer after every blow is performed by a spiral or rifling arrangement; this consists of a rifled round steel bar attached to the top cylinder cover by a grooved collar, the round cylindrical end projecting through the cylinder cover is provided with a ratchet wheel, a pawl fixed to the cylinder cover allows the ratchet wheel and rifled bar to rotate in one direction only. The back end of the piston and piston rod is made hollow, and fitted at the end with a nut corresponding to the spiral of the rifled bar which projects into the piston. The bar is provided with eight spiral grooves of 7 ft. pitch. On the down stroke of the piston the frictional resistance which opposes the rotation of the piston and piston rod is greater than that opposing the rotation of the rifled bar, so that the latter rotates slightly during the downward stroke, during the back stroke, however, the pawl and ratchet wheel prevents the rifled bar from rotating, so that the piston and piston rod and borer are compelled to rotate during the upstroke. The stroke of the piston and the pitch of the spiral are so proportioned that the cutting tool makes a complete revolution per every twelve blows.

The Ingersoll rock drill is made in various sizes, the smallest having a 2½-in. cylinder and 3½-in. stroke, and weighs about 170 lbs., and will bore from 8-in. to 13-in. holes to a depth of 10 ft. In very hard trap rock it is said to drill a 1-in. hole 3½ ft. deep per hour, with about 800 blows per minute. The largest size weighs about 820 lbs., and has a cylinder 5 in. in diameter, the stroke varying between 5½ in. for very hard rock and 8 in. for the softer kinds, the bore holes varying from 1½ to 5 in. in diameter, and may be carried to a depth of 40 ft. The machine works at the rate of about 400 blows per minute, and with a 3½-in. hole will average 2½ ft. per hour in the hardest trap rock. At the St. Helier's Harbour Docks, Jersey, the Ingersoll carried a 3-in. bore hole 14 ft. deep in 10 hours.

For sinking purposes the Ingersoll is carried on trunnions on a tripod stand, the legs of which are telescopic, so that they can be lengthened or shortened. The trunnions carry a circular hollow disc or plate, in which a turned boss cast on the frame carrying the cylinder fits, the two being connected by a strong bolt or pin. This arrangement constitutes a universal joint, so that the drill can be fixed at any inclination desired. A gadding car or carriage has been designed for carrying the Ingersoll drill when used in quarry work. This consists of a flat cast-iron bed plate mounted on four wheels, and having at each corner a socket in which a pointed bar can be fixed by means of set screws; these four pointed bars may thus be made use of as legs, on which the machine rests more firmly than on the wheels alone. On the bed plate a vertical triangular casting is bolted, having a front planed face, on which a face plate slides in grooves, and can be clamped at any height. The face plate carries the drill; by means of a chain attached to the face plate, and

* Being Notes on a Course of Lectures on Mining, delivered by Herr Berggrath, Dr. Von Groddeck, Director of the Royal Bergakademie, Clausthal, The Harz, North Germany.

which passes over a pulley fixed at the top or head of the triangular standard, and down to a drum or winch provided with a ratchet wheel, pawl, and handle the drill can be readily raised and lowered.

For very heavy work, such as tunnelling, &c., where it is desired to have several drills working at the face at once, a special railroad or tunnelling car has been designed and manufactured in two sizes, the smaller for carrying two drills, weighing nearly 1½ ton, and the larger one for carrying up to eight drills, weighing nearly 3 tons. The car is mounted on four wheels, and carries at its back end a casting in which a long screw fits, which latter can be tightened against the roof of the tunnel. This casting has three large holes placed vertically above one another, through any one of which a strong pin can be passed. On this pin a long arm is pivoted, having a small forked end where it is pivoted to the car, and a broad forked end, which carries a long bar, on which the drills are mounted. This end of the arm carries a long screw, which can be tightened against the roof. The centre of the arm carries a swelling, in which a nut is fixed; through this nut a screw passes, so that on rotating the latter the long arm is raised or lowered. A cast-iron slot sector which is bolted to the carriage, and formed in two halves, one passing upwards on each side of the arm, serves as a support to which the arm can be clamped, by means of a bolt passing through a corresponding hole in the arm and two washers, so that when the bolt is tightened up the arm is firmly clamped to the sector. This drill has been extensively used in Europe and America, having been awarded the medal of the American Institute.

The last form of percussive drill which will claim our special attention is that invented by Mr. J. Darlington. This machine is designed to have as few moving parts as possible, and to do away altogether with the great objections that usually attach to tappet motions. There is no valve or valve motion in the ordinary sense of the word in this drill, which consists essentially of the cylinder and piston alone. The steam or compressed air pipe is fixed to the front end of the cylinder, which is always filled with compressed air. The piston and piston rod are forged in one piece; the diameter of the piston rod is about three-quarters that of the piston, the borer being fastened to the front end of the piston rod in the following manner:—The extreme end is filed down for a short distance to afford a flat seat for a washer beneath a nut. In a plane at right angles to that of the flat seat a square hole or slot is drilled or slotted out, and a piece of steel forged to the same size to fit the slot is inserted; the end of this piece of steel ends in a short screw, over which the washer and nuts pass. Whilst the piece of steel is in its place a hole is drilled to receive the end of the borer or cutter, the end being made hemispherical so as better to receive the shock or blow. It will be thus seen that when the borer is inserted and the nut tightened up the cutting tool is readily and firmly secured in its place. The compressed air, as we have just mentioned, always fills the lower end of the cylinder, and consequently presses against the annular portion of the piston, the forward blow being made in consequence of the greater total pressure on the back of the piston. The piston is nearly of the same breadth or length as the stroke. An equilibrium port, or rather a communicating port, extends about three-quarters the length of the cylinder at the back portion of the cylinder, one of the entrances of the port into the cylinder being situated close to the back cylinder cover, and the other at about one-half the length of the stroke from the front end of the cylinder. This port only communicates with the two ends of the cylinder.

To commence with, let us imagine the piston is just having completed its forward stroke. The compressed air, communicating always with the front end of the cylinder, begins to drive the piston back, which at present covers the lower entrance of the equilibrium port; when the piston has traversed about one-half of the return stroke it uncovers the lower entrance of the equilibrium port, and the compressed air rushes along the equilibrium valve to the back side of the piston and the total area, and consequently pressure on the back of the piston, which is greater than that on the front annular portion, gradually arrests its motion, and then drives it forward towards the bore hole, the piston during this forward stroke cutting off the compressed air itself by covering the lower of the entrances of the equilibrium port. It will be at once evident that the piston completes the remaining portion in virtue of its momentum, and the expansion of the compressed air at the back against the pressure of the compressed air on the annular space at the front side of the piston. Just before completing the stroke the piston uncovers the exhaust port, which should be of comparatively large area. It might at first sight be supposed that the retarding effects of the pressure on the front end of the piston would reduce considerably its effect; it is, however, simply a matter of properly proportioning the diameter of the piston rod (which extends only on the front side of the piston) to that of the piston, so as to make the total pressure on the back of the piston even when reduced by expansion greater than that on the front end up to the instant of the uncovering of the exhaust port. Suppose, for example, that the piston is 4 inches in diameter, and the piston rod 3 inches in diameter, and that the length of the stroke is 6 inches, and that the lower entrance of the equilibrium port is just covered by the piston when it has completed one-half of the forward stroke, and besides that the drill is worked at a pressure of 40 lbs. to the square inch. Then the total pressure on the back of the piston is 500 lbs., and that on the annular space on the front side of the piston 220 lbs., giving an excess of 280 lbs., driving the piston forward during the forward stroke. As soon, however, as the piston closes the entrance to the equilibrium port the steam or air begins to expand behind the piston, and consequently the total and initial pressure on the back of the piston becomes less, and at the end of the stroke, just before the uncovering of the exhaust port, the compressed air occupying twice the space has only half the original initial pressure—about 20 lbs. to the square inch—and the total pressure on the back of the piston, just before the completion of the stroke, will be a little above 250 lbs., which we see is thus still 30 lbs. in excess of the total pressure constantly acting on the front end of the piston.

The mechanism is very similar in principle to that we have learnt in the description of the Ingersoll. It consists of a rifled or spiral bar having three grooves, the head of the bar being fitted with a ratchet wheel recessed into the back cylinder cover. Two pawls or ratchets likewise recessed into the cylinder cover are kept pressed against the ratchet wheel by spiral springs. They prevent the rotation of the drill bar only in one direction. The back end of the piston is provided with a round hole in which the rifled bar can slide. The front end of this hole has a steel nut inserted which accurately fits the grooves in the rifled bar. During the back stroke two pawls prevent the ratchet wheel and bar rotating in the direction in which the piston tends to rotate them, and hence, during the back stroke the piston, piston rod, and cutter are compelled to rotate; during the forward stroke, however, the form of the ratchet teeth permit the latter to rotate, and as the friction which opposes the rotation of the rifled bar and ratchet wheel is less than that which opposes the rotation of the piston rod, &c., the latter do not rotate at all during the forward stroke.

The gradual forward motion is produced by hand by means of a long screw and a nut attached to the cylinder. If the machine be fed forward too fast it will stop working in consequence of the piston not coming sufficiently far forward to uncover the exhaust valve. The Darlington rock drill is mounted on a bar by means of an ordinary universal joint. This machine is, perhaps, the simplest in construction of any rock drill yet brought out; this simplicity, however, is obtained at the sacrifice of the automatic forward feed of the cylinder as the hole gets deeper, and consequently requires greater attention on the part of the attendant workman. With a pressure of 40 lbs. to the square inch the Darlington works up to a speed of 1000 blows per minute; the total length of the machine is between 35 in. and 40 in., the piston 3½ in. in diameter, the piston rod 2½ in. in diameter, and the maximum stroke 4 in. The total weight of the machine is about 100 lbs. that of the striking mass (a piston, piston rod, and cutting tool) 35 lbs.

GEOLICAL TIME.—At the last meeting of the Royal Society the Rev. Samuel Haughton read a paper on a new method of finding limits to the duration of certain geological periods. He had previously shown how he came to the conclusion that the elevation of

Asia and Europe displaced the axis of maximum inertia through 69 miles. The axis of rotation being thus separated from the axis of figure by 69 miles, or 1°, began to revolve round it. But for friction this would continue forever, and the object of the paper was to discuss how long would be required for friction to bring the axis of rotation to again coincide with the axis of figure. The friction is axis, until compelled to revolve round to-day's axis by friction years would be required to restore the coincidence of the axes, and therefore, the formation of Asia and Europe cannot be more recent. Further calculations gave the minor assignable limit to geological time as 11,000,000 years in round numbers.

THE EMMA MINE.

The renewal of shipments of ore from the celebrated Emma Mine will naturally cause all who are or have been shareholders in the now almost defunct English company formed for working it to consider anew the value of the property they so thoughtlessly threw away. Throughout all the clamour as to the alleged deception practised in the transfer of the mine to the English shareholders, as well as since it has invariably been asserted in the *Mining Journal* that if any reliance was to be placed in the opinion of practical miners who had visited the property, but were peculiarly disinterested a good mine, and worthy of development. That the English paid a large price for the mine is admitted, but that price was known to the whole world before the public invested one penny, so that the capitalists who speculated were like children who spend their money in covetous toys, then cry because the money is gone, and smash the toys to vent their spite. As the London Emma shareholders have now neither the capital invested nor the property they can dispassionately consider their position, and estimate the advantages of patience and common sense in the conduct of mining operations as compared with rashness and the love of litigation. From the time the Emma Mine passed into the hands of the English company exploration (the one thing necessary to secure permanent profits in mining) was entirely neglected, and a system of careless management was carried on which in a few months would bring into the winding-up courts even such properties as the Cape Copper, Linares, Fortuna, Pontgibaud, and others equally successful. The London Emma shareholders appeared to suppose that even ordinary business energy and judgment were unnecessary, and that nothing had to be done but receive the periodical dividends for ever. Such marvellous benefits are not secured in mining any more than in other business.

And the puerile simplicity of the shareholders is the more apparent when it is considered that the fact that the property was being ruined by bad management in the shape of neglect to provide for the future was well known to the shareholders long before it was too late to retrieve their position, and when even a small outlay upon exploratory work would have made the Emma property rank at least with the Richmond or any other American concern on the English market as a permanently profitable undertaking. Foremost in his reiterated assertions that the Emma was being crippled through inattention to development was an esteemed correspondent of the *Mining Journal*—Mr. Henry Sewell—and the few of his facts re-published last week suffice to show how small a drag upon the returns from the mine would have sufficed to do all that was necessary. Well may Mr. Sewell wish the readers of the *Journal* to be reminded how often he requested Mr. A. MacDougall to accept the 50,000/ offered to the English shareholders by Messrs. T. W. Park and Albert Grant to work the mine. It should be remembered that this sum was only to be returned in case the mine paid for it—that is, three-fourths of the net proceeds were to be for the English shareholders, the remaining one-fourth to be devoted to the payment of the 50,000/. Mr. Sewell thinks there is no doubt that the shareholders have been badly directed in their law-suiting business; and he mentions that he predicted to Mr. MacDougall that he would never gain this suit in America, which was a greater reason that the 50,000/ should have been accepted.

The character of the rock in which the Emma Mine is situated rendered exploration of even more than usual importance; and hence Mr. Sewell remarked in his pamphlet on the Emma (published when there was still time to have avoided the subsequent litigation, which very properly deprived the company of the mine altogether) that, owing to the geological features of the district, and especially the nature of the rock between which the ore body was found—stratified limestone—the future prospects, assuming ore to continue, would entirely depend upon the due working of the mine, so as to have proper reserves, and the due arrangements for development, such as provision for ventilation, and proper machine power for pumping and for raising the ore, and thus pushing on of exploratory works, so as to find further bodies of ore both horizontally and towards depth, as the then existing ore body in the deepest part of the mine showed signs of compression, and so might be expected soon to be reduced, and to go off to a mere thread. Mr. Sewell was well aware that limestone formations, such as are found at the Emma Mines, and in which he had some years' experience in Spain, Chili, Peru, and Mexico, and in which some of the richest ore bodies have been found, were often affected by such compressions, but so long as there was a continuance of the vein, however thin, there was a fair prospect of its again opening out, and producing as valuable a body of ore as was then being worked. He mentions that even in the celebrated Potosi Mines, which for 246 years yielded the Spanish Government 800,000/ per annum as royalty, the veins were constantly being affected by these compressions, varying from several yards to the thickness of a penknife blade.

It is but justice to Mr. Sewell to state that his views appear to be now receiving full confirmation, although at the time he wrote they were ignored, from the circumstance, probably, of his opinion being diametrically opposite to those of Mr. Warren Hussey, one of the original vendors and a large local shareholder; of Mr. Silas Williams, the mine agent; of Mr. George Attwood, the mine manager; of Mr. Clarence King, a celebrated American geologist; Prof. Murray, a mineralogist; and Mr. John Longmaid, a mining engineer who condemned a neighbouring mine as containing no ore worth raising, though the succeeding proprietor quickly raised 2000 tons of silver-bearing ore, and continued to turn out regularly 300 tons per month with good profit. That Mr. Sewell wrote from actual knowledge, and not from mere hypothesis, seems evident, since in July, 1872, he made an affidavit in one of the local courts that the Emma was bed vein, and that it would be proved to be the same as the Flagstaff, Vallego, and several other mines in the district. The correctness of this has now been proved by subsequent events, for the Emma bed vein is continuous for about 10,000 ft., and is not an isolated body of ore, as was supposed by some. Upon these facts Mr. Sewell very reasonably argued that the length of the Emma vein having been proved by actual work of the mines that are situated on the same vein for a distance of 10,000 ft., such as the Flagstaff, Vallego, and others, to be a master vein, it is but reasonable to suppose that new ore bodies will be found in depth as well as in length, as already stated. Mr. Sewell explained that the Emma at the time he examined it exhibited distinct and marked characteristics of a well defined segregated strata vein; the footwall has a regular pitch into the hill of about 45°, and a course in a north-westerly direction, corresponding with the footwall found in the Flagstaff Mine, which development will, in his opinion, prove to be identical with that of the Emma. The accuracy of Mr. Sewell's views will certainly add to his already high reputation as a mining engineer, and although the Emma has been lost to the English capitalists a compensation may be found in the neighbouring mines which are still in English hands.

HOLLOWAY'S OINTMENT AND PILLS.—Though it is impossible, in this climate of changing temperature, to prevent ill-health altogether, yet its form and frequency may be much mitigated by the early adoption of remedial measures. When hoarseness, cough, thick breathing, and the attending slight fever indicate irritation of the throat or chest, Holloway's ointment should be rubbed upon these parts without delay, and his pills taken in appropriate doses, to promote its curative action. No catarrhs or sore throats can resist these remedies. Printed directions envelope every package of Holloway's medicaments, which are suited to all ages and conditions, and to every ordinary disease to which humanity is liable.

DESERT OF ATACAMA—No. II.

ON THE RECENTLY DISCOVERED NITRATE DEPOSITS IN THAT PART OF THE NORTH OF CHILE WITHIN THIS DESERT.

[Extracts translated from Notes of Commissioner sent by the Chilean Government.]

"SALITRERAS," OR NITRATE DEPOSITS.—The deposits of nitrate of soda, or "salitreras" as they are commonly called, are spread over the more central parts of the desert from 26° 30' to 24° south latitude. They are situated at the heads of the plains that disemerge into the large hydrographic hollows, or into other plains, so shut in on all sides that they appear to have been the sites of former inland seas or large lagoons. They are only found at certain distances from what appear to have been the water-courses of ancient streams; and both in the valleys and in the plains the heaviest deposits are found, not in the centre of any hollow or depression, but on the slopes of the low hills that circumscribe them. This position of the more abundant deposits appears to be due to the great solubility of the nitrate of soda. In the lower parts, where the waters must have accumulated, they would have been in sufficient quantity to dissolve the nitrates, and in sufficient force to convey them by infiltration to unknown depths. The situations in which nitrates may be found can be recognised by certain signs, and present themselves under two different aspects. Those called "salares" are easily known by the quantity of common salt that appears on the surface. This superficial cover of salt forms rounded masses full of cavities, and composed, besides salt, of sulphates of soda and of lime, mixed more or less with other matters. It is below this covering of salt that the nitrates are found, generally in strata or layers, whose thickness varies from 4 to 20 in., of a dark colour, a porous structure, and always mixed with a certain quantity of the soil of the desert.

The central parts of these salares are always poor in nitrates, it being only in their banks or internal slopes that cleaner or richer deposits are found. In the other class of salitreras the nitrates do not appear on the surface, this being composed of a stratum of earth with small stones that hides them from view; nevertheless, there are certain signs of their existence beneath their earthy covering. The first of these is the existence here and there in the superficies of small natural holes, which appear, especially in the lower parts, in my depressions where the waters may have collected and dissolved the nitrates. On the disappearance of the nitrates the ground would naturally sink down and remain full of holes. The other sign is the numerous small fissures observable on the surface, cutting each other in all directions that divide it into polygons, that remain naturally sketched out, as these fissures become filled with the coarse sand and angular stones of the desert. This singular aspect is the result of the shrinkage in bulk of the masses of nitrate on their crystallisation into prisms having extended to the surface. The presence of calcareous has also been taken for a sign of the existence of nitrates, and doubtless they are found in quantities in many salitreras; but, on the other hand, there are many others in which none appear, and taking into account the origin of the calcareous above noted it will be seen that they have no connection with the existence of nitrates. Underneath a layer of ground, varying in thickness from 4 to 8 in., there is a compact stratum formed principally of gypsum and small stones, to which the workmen give the name of costra, or crust. Its thickness generally varies from 8 to 16 in., and it is below this crust, or costra, that the nitrate of soda is found. This latter appears in irregular strata, whose thickness varies from 6 to 8 in., up to one of 6 ft. or more; a like irregularity is observable in the quality of the nitrate. In one part of a deposit it appears compact, and mixed only with common salt and sulphate of soda, whilst in another part of the same deposit it is found mixed with a more or less quantity of other extraneous matters also. Below the nitrates are found at times other strata, similar in composition to that of the crust, or "costra," whilst others again rest on rocks similar to those of which the circumjacent hills are composed. In the latter case the nitrates are more pure than when they rest on strata of gypsum and sand.

Of the deposits of nitrate yet known the nearest to the sea is the one situated near the watering-place (or oasis) of Cachiyuyal. It begins about 4 miles to the south-east of that watering-place, and reaches as far as the mountain of Hornillo. It is situated on a rather low sloping plain that raises itself up to the west of the ancient river of Cachiyuyal, and forms a narrow band of nearly 5 miles in length by 50 to 60 yards in width. It is in the middle of this long strip that the nitrate of this deposit reaches its greatest thickness of about 1 yard, but this gradually diminishes as it leaves the centre. The nitrate is of a yellowish colour, contains much salt, and its ley of soda nitrate does not pass 25 per cent. Going to the north-east, and at about 16 miles from the above-named watering-place of Cachiyuyal, we come to the Salitrera of Gonzales. This is situated in a small depression, surrounded by the low hills that make their appearance on the north of the road to Cachinal de la Sierra; this deposit of Gonzales is of small extent, and very irregular, but contains nitrate of good quality, although much mixed with a peculiar class of sand, it rests directly on the porphyritic rock, in which it forms a kind of lodes or veins. Continuing to the north-east we come to a high tableland covered with chalcocite, after traversing which we arrive at the Salitrera del Baron, situated some 7½ miles from that of Gonzales. This deposit—Bel Baron—has been but little explored; in a hole 1 yard deep the nitrate is seen overlaying the porphyritic rock, into which it appears to penetrate a few inches; the nitrate is mixed with sand in proportions varying from 20 to 35 per cent., it is white and very pure, the soluble parts give a ley that passes 45 per cent.

The Salitreras on which most has been done in the way of exploration are those of the company of Callejas, Guzman, and others; they are situated north of those of the Baron, at a distance of about 10 miles. They occupy an extensive plain shut in by an embankment of low hills, whose centre appears to have been occupied by a lake. In this central part only a thin stratum of nitrate is found but on approaching the banks or hills the deposit assumes an appearance of much greater importance. On the southern part, thanks to the numerous holes made there, its thickness can be seen and estimated, it always exceeds 1 yard, and at times reaches to 2 and 2½ yards. The nitrate is very compact, of a yellowish tint, containing much salt and sulphate of soda, and its ley, taken from several samples, varies from 23 to 30 per cent. of nitrate of soda. This deposit rests on a rather hard substratum of gypsum, with small stones. The more northern allotments known by the name of Tercera (or third) Salitrera contain the same class of nitrates, but the bed, or stratum, is thinner, and scarcely exceeds 1 yard. As far as has yet been seen it rests on the same rock as the former one, and at times on a decomposed porphyry, and it is noticeable that in the latter case the quality of the nitrate improves.

After having passed the ridges of low hills that shut in on the north the second and third Salitreras, we arrive at another and very extensive plain, in which has ultimately been discovered a new deposit; this, as yet, has been only very partially explored, principally in the western part of the plain. The situation and the class of nitrates have a perfect analogy with those of the Baron; as, in that Salitrera, the nitrate is mixed with a certain quantity of sand, but it is of superior quality, containing but little salt or sulphate of soda, and its ley is more than 40 per cent.

Finally, eastward of these Salitreras (or Salares) in the direction of Cachinal de la Sierra two other deposits are found. La Descubridora de Banados, distant about 15 miles from the watering place, is situated in a plain of some 7 miles in length by 2 miles in width. The layer of nitrate has been explored in some parts carrying a thickness of about 1 yard; the nitrate has a red tinge, sufficiently pure, as two samples have given a ley of 38 to 42 per cent. The other deposit, known by the name of Primera Salitrera de la Compania de Guzman, is much less important, by no means extensive, and situated among some low hills, or slopes, to the south of the Descubridora de Banados. Few works of exploration have been undertaken, so that it is difficult to form any exact idea of its importance; in some excavations nitrates have been found, in others sulphate of soda alone. Such are the Salitreras of Cachinal.

The difficulties of all kinds, and the scarcity and cost of labour, have not allowed the completion of the explorations necessary to judge of the importance of these deposits. Generally speaking, the discoverers limit themselves to the attainment of a view of the

nitrates without caring to ascertain their thickness or their quality, still less those of their surroundings; while, on the other hand, the great irregularity of these deposits make much labour and expense necessary to form any tolerably correct estimate of the quantity and quality of the nitrates that may exist therein. But from the general result of the few observations yet made two facts are apparent: First, it is evident that the richer part of a deposit is not to be met with in the centre thereof, but ought rather to be looked for on the slopes of the low hills or embankments that usually enclose in all sides that they appear to have been the sites of former inland seas or large lagoons. They are only found at certain distances from what appear to have been the water-courses of ancient streams; and both in the valleys and in the plains the heaviest deposits are found, not in the centre of any hollow or depression, but on the slopes of the low hills that circumscribe them. This position of the more abundant deposits appears to be due to the great solubility of the nitrate of soda. In the lower parts, where the waters must have accumulated, they would have been in sufficient quantity to dissolve the nitrates, and in sufficient force to convey them by infiltration to unknown depths. The situations in which nitrates may be found can be recognised by certain signs, and present themselves under two different aspects. Those called "salares" are easily known by the quantity of common salt that appears on the surface. This superficial cover of salt forms rounded masses full of cavities, and composed, besides salt, of sulphates of soda and of lime, mixed more or less with other matters. It is below this covering of salt that the nitrates are found, generally in strata or layers, whose thickness varies from 4 to 20 in., of a dark colour, a porous structure, and always mixed with a certain quantity of the soil of the desert.

SALITRERAS OF AGUAS BLANCAS.—In latitude 24° 6', and 40 miles in a direct line from the coast, there commences an extensive salar, which reaches on the south to the plain of Aguas Blancas, and thence passing around a range of low hills, extends towards the east to a place called Las Cuevas (the caves), or Aqua Dulce, occupying a space of 23 miles from east to west, by 10 miles north to south. Underneath a layer of salt covers the surface of this salar nitrate of soda is found in strata or beds of 4 to 8 in. thick, somewhat impure, and mixed with earth, salt, and sulphate of soda; but on the borders of this salar the layers of nitrate reach a thickness of from 20 in. to 2 ft. at the same time that it becomes more compact, so much so that samples taken from such excavations have given a ley of 23 per cent. The deposits of this region may be said to be as yet unexplored, though there is evidence of an improvement in the quality of the nitrates in the southern part, as also towards the south-east in the direction of the Cordillera de Varas; this is the part that presents the best aspect, as it is a known fact that these salares contain few or no nitrates in their central part, and those few of poor quality, whilst on their borders or margin (in this case towards the south and south-east) rich deposits may be anticipated, and towards those parts should the exploration be directed.

ORIGIN OF THE NITRATES.—Some considerations on the origin of these nitrates of soda are not out of place here, as they disinvolve consequences that may facilitate further discoveries. The presence of common salt or chloride of sodium in all these salitreras, the existence of this substance covering extensive plains, as in the example of the salar of Aguas Blancas, establishes a certain relation or correspondence between the sea and these deposits, and leads us to place them in the category of ancient marine formations. But if we study with more attention the situation of these Salitreras, as also the substances that they contain besides the nitrates, if we note that in none of them does there exist either calcareous formations or stratified rocks, as would have been the case had they been deposited in any ancient bay, and ultimately that in no one of them have any vestiges of sea shells been found, we come to the conclusion that the only analogy between these nitrate deposits and marine formations is the presence of salt; moreover, in many parts the nitrates are mixed with small stones, whose presence precludes all idea of a deposit formed slowly in the midst of seas, or salt lagoons, and by their evaporation. The nitrates, in lieu of occupying the lower parts of any district, always affect the slopes of the hills, and at times are found on mountain plains, as may be seen at the mines of Paposo, or even on the Cordillera of Marigunga, fully 15,000 ft. above the sea level, where nitrates of soda are found. It is therefore evident that their origin is altogether local, that they have not been transported from elsewhere, but formed *in situ*. Let us, therefore, endeavour to find out whence the elements that constitute nitrate of soda proceed, as also those of the other substances that always accompany them, as sulphates of soda, lime, and chlorides of sodium. The constituent elements of these are lime, nitric acid, sulphur, and chlorine. All these Salitreras are found surrounded by hills composed of felspathic rocks, and the sand that covers the plains and slopes of the hills is composed of the same elementary material. The felspars that form these rocks are the labradorites, the Albites, and the oligoclasses. The labradorite contains a quantity of lime, the Albite from 8 to 10 per cent. of soda, and the oligoclase both soda and potash. Thus there exist in this rock the bases of the salts that are found in the Salitreras, the acids alone are wanting. All the rocks contain pyrites, which on oxidation may have supplied the sulphuric acid.

It is known that chlorine is always produced in quantities in volcanic emanations, and that the waters that spring from the midst of Trachytes contain quantities of chlorides. To account for the formation of nitric acid appears at first sight difficult, but the experiments of Cloes have established to a certainty that the alkaline carbonates, when in the presence of oxidisable substances, possess the property of condensing the elements of the atmosphere, and transforming them into nitric acids. If what was stated above regarding the rapid decomposition of the rocks of the desert be borne in mind, it will be easy to comprehend the formation of nitrates and their situation at the base of the hills. The rocks gradually moulder away, and are reduced to a coarse sand on the slopes of the mountains, which the few but heavy showers of the desert carry down to the plain. This felspar sand undergoes the decomposition above indicated, and is reduced to an earth composed of kaolin, mixed with sulphate of lime, chloride of sodium, and carbonate of soda; this last is in its turn converted into nitrate, and when other showers fall the soluble salts are carried by infiltration to the bases of the hills, whilst the sulphates of lime, much less soluble, remain mixed with the kaolin. This layer of sulphate of lime and clay that forms the crust of the nitrate beds is found not only on the plains, but often near the summit of the hills, and wherever the superficial sand of the desert is removed, a white porous substance is found, composed principally of sulphate of lime. When the waters of infiltration evaporate the salts that they hold in solution crystallise, and thus is explained the reason why the nitrates are always found mixed with greater or lesser quantities of earth and sand. It is, therefore, evident that the nitrates have not a marine origin, but that the Salitreras are the natural consequence of the decomposition of the felspathic rocks; and as this class of rocks occupy the central parts of the desert, from the Rio Salado to the 21st parallel, there can be no doubt that besides those actually known, there exist many other Salitreras between the 25th and 26th parallels.

QUANTITY OF NITRATES.—The explorations made till the present in the Salitreras of Cachinal and Aguas Blancas are so insufficient as to make it rash to attempt to estimate, even approximately, the quantity of nitrate that they may contain. All that can be affirmed is that the quantity is large, and to give some idea of what it may be we will confine ourselves to the two allotments to discoverers—to those of the second and third Salitreras of the company of Guzman, which are those that have been most recognised. These allotments comprise 6,000,000 square metres. In several pits made in chance situations therein the thickness of the bed of nitrate ranges from 1 to 2½ metres; by taking only 1 metre as the average thickness we keep much below the mark, and this gives us 6,000,000 cubic meters, equal to 212,000,000 cubic feet (33,333,000 cubic feet by 6). A cubic foot of nitrate weighs about 106 lbs., equal to a trifle over 1,000,000 tons, and supposing a ley of 20 per cent., we have a result of 200,000 tons of purified nitrate of soda, or (say) sufficient to maintain for 40 years an annual product of 5000 tons of the refined nitrate.

MEANS OF EXPLORATION.—The nitrate deposits cannot well be compared with coal beds or other stratified minerals; they are so very irregular both in their thickness and quality that in order to reduce first expenses their exploration should commence in those parts where those of the highest ley are likely to be found, not a difficult matter when the small depth at which they are found and the soft nature of the crust that covers them are taken into consideration. The refinement of the crude nitrate is based on the much larger quantity of nitrate of soda soluble in hot than in cold water. At a temperature of 50° Fahr. water dissolves 0.78 of nitrate of soda, whilst at 212° it dissolves 1.77; this difference of (1.77 - 0.78 = 1.00) is what separates and crystallises on cooling. Fuel is, therefore, a first requisite, and forms a principal expense; it may be found possible to substitute the sun's rays; nor would it be difficult during the day, and in an apparatus designed for the purpose, to raise water to a temperature of 140° Fahr., at which temperature

it dissolves 1.21 of nitrate, and on cooling would leave (1.21 - 0.78 = 0.43) of refined nitrate. The most desirable quality of nitrate is not always that of the highest ley, the compact nitrate dissolves with difficulty, and requires the previous employment of a stone-crusher, whereas the nitrate mixed with certain quantity of sand is much more soluble. In some Salitreras sufficient water for the treatment of the nitrates is not found, and they would have to be carried to where water is attainable, but such establishments ought not to be allowed near the fresh-water wells, as the residues would, by infiltration, mix with the water and render it unfit for domestic purposes.

MEANS OF TRANSPORT.—When treating of low priced products the cost of their transportation becomes a matter of vital importance, and cheap freight becomes a *sine quid non*. In this respect the Salitreras, especially the more northerly ones, are by no means favoured by Nature. Between the 26th and 24th parallels the Cordillera of the coast has an average height of near 4000 ft., and in all its extension only presents three passes through which it may be possible to establish a communication between the coast and the interior. The most northerly one, called the pass (Portezuelo, or Quebrada) De los Remiendos, has been studied by a special committee. It presents no great difficulties for a cartroad, but a railroad would be no easy matter. The Quebrada, or valley, commences on the coast in 24° 21'. For a short distance it takes a north-easterly direction, and then changes its direction to east, and east-south-east, till it reaches the first plains, at a distance of 17 to 18 miles from the coast; further on, and until it reaches the pass of Cardones, the ground presents no difficulties, but the rise through this pass is considerable, with a corresponding fall on the other or western side. To reach the vega of Aguas Blancas carts would have to perform a journey of 60 miles from the coast, and taking into account the difficulties of the road could not well carry over 50 quintals (500 lbs.) each. The pass of Paposo, in lat. 25°, presents still greater difficulties, and a good cart road there would be a difficult and costly affair. Finally, in lat. 25° 24' there is the port and valley (or opening) of Taltal. Here the coast chain is completely cut through, and the ground rises gradually from the sea to the foot of the Andes. The altitude of the watering-place of Cachiyuyal, situated at the entrance of the plains (or table-land) is 4500 ft., at a distance from the sea of 38 miles, equal to a grade of 118 ft. per mile, or about 2½ per cent. This grade is generally uniform, except for a short distance below Las Breas, where there would be some difficulties, but these could be overcome at no great cost. This valley, therefore, does not present an unfavourable location for a railroad, and from the watering-place of Cachiyuyal to the Salitreras of Cachinal the grade is still lighter. The difference of altitude between the second Salitrera of the Company of Guzman and the wells of Cachiyuyal is 1950 ft., and the distance between these two points is 25 miles, equal to a grade of 78 ft. per mile. From the Salitreras to the sea the fall is sufficiently steep and uniform to allow of the descent of the loaded wagons by the force of gravity alone. The port of Taltal appears destined to become the principal centre for the export of nitrates, and of all the products from the interior of the Desert, and these are not likely to be confined to nitrates alone, not to mention guano, borax, and other products.

From the 27th parallel to the limit of Chile, on the north, there are few parts of the Cordillera of the coast that do not contain some mineral veins. We need only remember the mines of Salado, Las Animas, Carizalillo, Cachiyuyal, Paposo, &c. What chiefly characterises this region (the Cordillera of the coast) is the abundance of minerals of copper; these occupy principally the eastern slope of this chain of hills, and are found in those parts where the syenitic rocks are traversed by dykes of labradorites and augitic porphyries. They generally form veins placed between these dykes and the syenites, or in their prolongation, as if these lodes had been fissures, caused by the latest Plutonic rocks, and filled by the mineralised copper. In other parts it is seen to penetrate this rock, and form considerable masses, as happens at Carizalillo. There is also a notable difference in the formation of these minerals according as they are found in relation with the labradorites, or with the augitic porphyries. In the case of the labradorites, after passing the upper part of the lode that contains the oxides, chlorides, and silicates, we come to the copper pyrites, while in the case of the augitic porphyries we come down upon the sulphurites, the grey oxides, &c. (called here Bronce Morado); in this latter case this richer class of ores contain always a certain ley of silver, and in the former case the pyrites a certain ley of gold. The deposits of copper ores are not limited to the coast, but are also found at the base of the Andes; and as in this region the augitic porphyries predominate, the ores are richer, composed of grey copper, sulphurites, carbonates, and oxichlorides, but the great distance that separates them from the coast, as also the difficulty of procuring fuel, have prevented their exportation. It is also on this western slope of the Andes, where rocks of the Jurassic formation appear, that the silver mines are situated; a constant relation exists between the calcareous rocks and the augitic porphyries, the trachites, and silver lodes. These occupy a position similar to that occupied on the coast by the copper lodes, and fill up the interval between the calcareous rocks and the porphyritic and trachitic dykes.

If we bear in mind what has been said above regarding the distribution in the desert of the Jurassic formation, it is easy to form an idea of the situation occupied by the silver lodes. It has been seen that this formation, besides appearing on the western slope of the Andean chain, extends westward across the desert following the transverse ridges of hills that divide it, so as at times to approach near to the coast. The mineral districts known as Chimbero and Trespuentes are a first example of this distribution in a transverse chain. More to the north are the mines of Florida, situated on a band of calcareous formation that forms a part of the anticlinal ridge that shuts in to the north the hollow or depression of Salado. A dyke of augitic porphyry, with an east and west direction, has there upheaved the calcareous strata, and it is in the immediate vicinity of this dyke that the silver lodes are found. Nearer to the foot of the Andes is the mineral of Sandon, and finally, near to the 24° of latitude, on the edge of the boundary of Chile, are the mines of Palestina.

ANALYSES AND LEY OF NITRATES OF SODA.

Nitrates from Aguas Blancas.	Parts 9
Insoluble—Clay and gypsum	91 = 100
Soluble	15
Nitrate of soda	58
Sulphate of soda	24
Chloride of sodium	8 = 103
Aluminate of alumina	51
Nitrates from Cachiyuyal.	49 = 100
Insoluble—Sand, clay, &c.	76
Soluble	24
Nitrate of soda	6
Sulphate of soda	34
Chloride of sodium	5 = 97
Aluminate of alumina	4 = 110
Nitrates from the Baron.	47
Insoluble	53 = 100
Soluble	52
Nitrate of soda	6
Sulphate of soda	34
Chloride of sodium	5 = 97
Aluminate of alumina	6
Iodine—traces of	15

LEY OF NITRATE OF SODA FROM VARIOUS SALITRERAS.

From Aguas Blancas	18
Baron	27
Barados	43
Aquilar	15
Cachiyuyal	6
Lavaderos	37
Pena de Aguas Blancas	6

REPORT OF THE COMMITTEE OF GOVERNMENT TO THE HOUSE OF REPRESENTATIVES IN CHILE, JULY, 1877.

Your Committee having taken into consideration the various petitions for the privilege of constructing and working a railroad from the port of Taltal to a place called Cachinal de la Sierra. Judging from the reports of engineers and others, there is no doubt of the existence in the Desert of Atacama, in those parts, of nitrates, guano, and other matters of commercial value, as also of many lodes of copper, consequently a railroad becomes not only expedient but necessary for the exploration of these natural riches, which exploration must without one be always imperfect. To avoid many incon-

veniences your Committee is of opinion that the best mode of procedure is that the House should authorise the executive authority to grant a privilege to such person or persons as may offer the most advantageous conditions; stating the general base of the contract and the maximum of the concessions that the Government can make. Your Committee, therefore, have the honour of proposing the following project of law:—

ART. 1.—The President of the Republic is hereby authorised—

1.—To grant a privilege for the construction and working of a steam railroad from the port of Taltal to a place called Cachinal de la Sierra.

2.—To grant to the party offering the most advantageous terms the following concessions:—

A.—Exclusive privilege for a term of 30 years to the exploration of said railroad.

B.—Exemption from import duties on all materials for the construction and working of the line.

ART. 2.—Of the proposals that may be made the Government will esteem the most advantageous—

1.—Such as offer the most efficient guarantee for the completion of the undertaking.

2.—Such as offer to construct it in the shortest time.

3.—Such as offer the most advantageous terms as regards freight and passengers.

4.—Such as trespass least on the public purse.

ART. 3.—*A sine quā non* to be the intervention of the Government in the tariff, so that in no case this remains in the exclusive domain of the contractors.

ART. 4.—The authorisation noted in Art. 1 to remain open for a term of two years.—Sala de la Commission, Santiago, July 12, 1877.

W. A. WALKER.

FOREIGN MINING AND METALLURGY.

Orders are being given out in the Belgian iron trade in a more and more regular fashion, always small quantities of iron it is true, but at any rate in a sustained manner. The Belgian Government has let some rather important contracts, which assure employment to the principal Belgian works. Other Government contracts are about to follow for first, second, and third-class carriages, vans, &c.—about 75 in all—required for the Belgian State Railways. The John Cockerill Company has delivered the lowest tender for the erection of a new station at Tournai; the terms required are 8760£, for the metallic portion of the work with payment in cash, or 8960£, with payment in old masts to the extent of one-half the contract price. The house of Eiffel, of Paris, has recently met with rather a serious misfortune in connection with a large iron viaduct which it is building at Culera, Spain. The length of this viaduct is upwards of 600 ft., and after about two-thirds of the ironwork had been erected it was carried away by a violent gale, and precipitated into the valley beneath. The Rhenish Railway Company has decided on closing its creosoting establishment at Nippes, as it proposes to have its permanent way composed exclusively of iron in future. The reduced tariff of 14s. 6d. per ton applied in September for the conveyance of rough steel and iron from Antwerp to Bâle on the Great Central Belgian Railway will be discontinued at the close of this month.

There has been a little more business passing in copper at Paris, and Chilean in bars has made 70s. per ton; ditto, ordinary descriptions, 69s. per ton; ditto in ingots, 70s. per ton; English best selected, 73s. per ton; and pure Corocoro minerals, 70s. per ton. Transactions in copper have been extremely restricted upon the German copper markets. There has been rather more doing in tin upon the Paris market, and prices have remained without great variations. The German tin markets have also been quiet, and prices have exhibited a tendency downwards. The Paris lead market has been inactive; the German lead markets have presented little change. Zinc has been tending downwards at Paris rather than otherwise. The German zinc markets have ruled quiet.

In the French iron trade the past week has brought no very great change. There has not been much business doing, and the chief consideration of the moment has been the appointment of MM. de Freyinet and Teisserenc de Bort as Minister of Public Works and Minister of Agriculture and Commerce respectively. Upon the whole, it appears probable that the free trade cause will gain by the appointment of these ministers. Pig appears to be in pretty good demand in France. This is regarded as a rather good sign. Prices remain at about the same level. In the Nord iron has been selling at about the same prices as hitherto. Mention is made of a contract having been accepted by the St. Etienne Steelworks Company for the plates required for the construction of 25 locomotives and five locomotive tenders. The rates at which this contract has been accepted have not transpired. In the basin of the Loire ironmelters appear to be tolerably content with the state of affairs; girders, for instance, are in some request. The quantity of iron which entered Paris in the first nine months of this year was 44,500 tons, as compared with 16,500 tons in the corresponding period of 1876. The receipts in October, 1877, were 4500 tons, as compared with 2500 tons in October, 1876. The imports of pig and cast-iron into Paris in the first nine months of this year were 18,500 tons, as compared with 1150 tons in the corresponding period of 1876. The imports of October, 1877, were 2200 tons, as compared with 1800 tons in the corresponding period of 1876.

The weather has at last become cold and winterly in Belgium. Supplies of coal are accordingly being laid in now in earnest; and although the circumstance may appear of comparatively little importance, several consecutive days of frost have already exerted a direct influence on stocks. Metallurgical industry appears to be taking up a stronger position. It still hesitates to conclude contracts for long terms, but it is consuming rather more freely, although not sufficiently so to bring about an improvement in quotations, which remain at rather a low point. The termination of the French political crisis appears to have restored confidence to some extent among the French, and it is expected that Belgian coal will now be taken more readily upon the Paris market. Upon the whole, the tone of the Belgian coal trade appears to have improved. The Levant du Fleur Collieries Company will pay, Jan. 2, an interim dividend of 2s. per share for 1877.

The happy return of public tranquillity in France and colder weather have involved rather a more active demand for domestic qualities of coal; some advance in prices has, indeed, been established in some few cases, but this advance can scarcely be said to have been general. As regards industrial qualities of coal, there has not been much change upon the French markets. The situation appears to resemble greatly the situation of a week or ten days since; this remark applies at any rate to the Nord and the Pas-de-Calais. Now that the French political situation has cleared up a great impetus has been given to preparations in connection with the Paris Universal Exhibition. The Naval and Railway Blast-Furnaces, Forges, and Steelworks Company will pay, Dec. 31, a dividend for 1876-7 at the rate of 8s. per share.

PROFITS OF MINING.—The various mines listed on the San Francisco Stock Board have in the aggregate levied assessments amounting to \$55,578,103, and have paid dividends amounting to \$10,494,199. It will be noticed that the dividends are almost double the assessments, and yet some people say mining does not pay. Mining in stocks does not always pay by a good deal, but mining in mines is a different thing altogether. It must be remembered also that many of the mines listed on the board were never expected to pay, or intended for anything else than means of levying assessments or disposing of stock. Everybody who has ever had anything much to do with the stock market understands why this class of mines exist, and knows also that if they had not been taken into account the assessments would have shown a much smaller figure, although the dividends would not have been increased. Moreover, it must be recollect that these are only an extremely small proportion of the many mines on this coast, and of those not listed on the boards very little is known as far as yield is concerned. There are hundreds of mines in every direction which are paying well which make showing in the above figures. For instance, we mention elsewhere in this issue the fact of the Idaho Mine of Grass Valley, paying its one hundredth dividend this month—\$2,270,820 in all—but it is a private corporation, and the stock is not dealt in on the boards. When one comes to think of it the figures given above show results which are not to be found in many kinds of business. A return of 100 per cent. on such large amounts is seldom found. The mines in question are mainly located in Nevada, very few California mines being enrolled on the boards. In fact, the

California mines on the boards are so few that of the total amounts they have only levied \$1,095,100 in assessments, and paid \$2,585,500 in dividends. Washoe leads the list with \$100,000 dividends, and \$44,908,189 in assessments. White Pine assessed us \$1,450,661, and only returned \$31,999. Ely district levied assessments amounting to \$2,031,000, and paid a return of \$4,432,500. Tuscarora and Cornucopia levied \$388,000 in assessments, for which they have only so far returned \$262,500; miscellaneous Nevada mines have levied \$2,380,250 in assessments, and returned for this expenditure \$2,135,000 in dividends. Idaho mines treated their investors badly, having drawn out in the form of assessments \$3,426,000, and returned as dividends only \$575,000. In the last case, however, it was, no doubt, more the fault of the management than of the mine. It is well to call the attention of the public to facts like these occasionally, so that they will appreciate the value of the mining interests of the country in proportion to their value.—*Mining and Scientific Press*, San Francisco.

GREETINGS OF PUBLIC COMPANIES.

SOUTH CARADON MINING COMPANY.

At a general meeting of shareholders, held at the mine, on Wednesday (Mr. RICHARD KITROW in the chair), the accounts for eighth, ninth, and tenth months showed a profit of 939. 19s. A dividend of 1024. (2s. per share) was declared, and the balance of 2694. 12s. 10d. carried to credit of next account. The following report was read:—

Dec. 26.—I am pleased to say the mine still returns as large quantities of ores, and as good quality as it has for many years past; and according to present appearances there is no reason to doubt of its continuing. I am sorry, however, to add, owing to the very depressed state of the copper market, our profits are not so large as they would be, but should the market improve you may expect your dividends to increase.—JOHN HOLMAN.

ALMADA AND TIRITO CONSOLIDATED SILVER MINING COMPANY.

The fifteenth half-yearly general meeting of shareholders was held at the offices of the company, Finsbury-circus, on Friday, Dec. 21,

Mr. WILLIAM MARTINEAU, M.I.C.E., in the chair.

Mr. H. G. DENNIS (the secretary) read the notice calling the meeting; the report of the directors was taken as read.

The CHAIRMAN said he regretted they had lost the services of their late Chairman (Mr. Needham), who had resigned his seat at the board, in consequence of having to go to Brazil. Mr. Needham had always bestowed great attention on every detail of the company, and he (the Chairman) would endeavour to follow that gentleman's example in that respect. They had before them the report of Mr. Breach regarding the operations at the mine for the first six months, and it would be presumptuous for him to say anything with regard to what had been done underground during that period. He was sure the shareholders would agree with him that the report showed an amount of work done and results obtained in a manner which reflected great credit upon Mr. Breach. He would say a few words on what had occurred since the date of Mr. Breach's report. First, he would refer to the fire in the mine. In July last the directors received a telegram stating that the probable loss entailed upon the company was \$1500. The first feeling of the directors was one of congratulation that it was no more; but they now saw that even if that \$1500 covered the actual expenditure upon repairs, the damage was not to be estimated in that way. The fire had thrown them back at least three months; but for the fire there was no doubt that three months ago the company would have been in the very materially improved position to that in which they found themselves to-day. The labour and personal danger incurred by Mr. Breach and the staff in the mine in repairing the damage done were very great, and they showed an amount of courage and resource which did them infinite credit. (Hear, hear.) Later on a resolution would be submitted thanking Mr. Breach and his staff for the great exertions they made in repressing the fire, and repairing the damage done thereby. The fire was the work of an incendiary, who was brought to trial, but got off—not through any fault of Mr. Breach's. Other people appeared to have had fires worse than occurred in this company's mines, and in one mine 30 lives had been lost through suffocation. The reduction of black ores by the lixiviation process has gone on satisfactorily, and bars of base bullion produced by this process had been received here, amounting to \$1328, and further shipments worth 1000£. were now on their way. He should like to mention that great credit was due to Mr. J. H. Clemons, cousin of the former manager, who was also the chemist and analyst at the mine, for the chemical knowledge which he had brought to bear in perfecting that process; the results obtained by him had been remarkable, and had caused some surprise, and even scepticism, on the part of men of experience, but he thought the silver they were receiving as the actual results of the process showed that they were actually what Mr. Clemons stated. (Hear, hear.) The company had also received bills of lading for about 4 tons of pitane metal, worth 400£. With regard to the state of affairs underground, particularly the discovery of the lode south of the south slide, he would read extracts from the last letters received from Mr. Breach within the last few days, which the directors had not yet had time to get printed and circulated:—

Capt. William Clemon, Oct. 18: Trito: The branch working in the first lode, south of the engine-room below the Tunnel level, has nothing new since last week. Our prospecting cross-cut through the south slide at the Tunnel level has no change report. The winze sinking below the 42 fm. level improves as it gets down; the lode is widening; the quality of the ore is the same. The water is now in fork at the 54; the timbermen are now engaged in putting in a penthouse at this level for sinking the shaft.

Providencia: The lode in this place continues to look very promising, and turns out a fair quantity of good green ore.

Mina Grande: The west branch appears to improve as we go down with the stopes. The pumping of the water in the Mina Grande shaft goes on satisfactorily.

Oct. 25: Trito: The branch working in the first lode south of the engine-room below the Tunnel level, is very much improved both in quantity and quality since last reported on. Our prospecting cross-cut through the south slide at the Tunnel level is now driven 40 ft. We yesterday cut a branch of green ore 2 ft. wide; this is not the lode we are driving to cut; this branch I think belongs to the first lode. The winze sinking below the 42 fm. level has no change worthy of notice.

Providencia: The lode in this place has a decided improvement since last week.

Mina Grande: The west branch continues to look well; the ore is now lengthening to the north. The pumping of the water in the Mina Grande shaft goes on favourably. I hope next week to be working in the 12 fm. level.

Nov. 1: Trito: The branch working in the first lode, south of the engine-room below the Tunnel level, has no change from last week. The branch of ore I mentioned last week that we had cut in our prospecting cross-cut through the south slide at the Tunnel level proved to be only a half, formed as all the ore is formed in the first lode of bars and bunches. The winze sinking below the 42 fm. level has now passed through the ore at a depth of 27 ft. We have now begun to drive north from the bottom of the winze, as the ore appears to be dipping to the north; in this end the lode is looking very promising.

Providencia: The lode in this place continues to improve; it now turns out a fair quantity of good green ore.

Mina Grande: The west branch is still looking well; no change to notice. We have not yet begun to work in the 12 fm. level, as the ground and stalks above are still dripping a great deal of water yet, which is falling into the winze, and would cause us to want to sink, but this water must drain off in a few days, when we shall commence to work in this winze. The water is now in fork in the Mina Grande shaft.

If possible, more solid as it goes down, as well broken from it so that it is not.

Providencia: The working in this place has no change from last week.

Mina Grande: The west branch is still looking well; no change to notice. We have not yet begun to work in the 12 fm. level, as the ground and stalks above are still dripping a great deal of water yet, which is falling into the winze, and would cause us to want to sink, but this water must drain off in a few days, when we shall commence to work in this winze. The water is now in fork in the Mina Grande shaft.

If possible, more solid as it goes down, as well broken from it so that it is not.

Providencia: The working in this place has no change from last week.

Mina Grande: The west branch is still looking well; no change to notice. We have not yet begun to work in the 12 fm. level, as the ground and stalks above are still dripping a great deal of water yet, which is falling into the winze, and would cause us to want to sink, but this water must drain off in a few days, when we shall commence to work in this winze. The water is now in fork in the Mina Grande shaft.

If possible, more solid as it goes down, as well broken from it so that it is not.

Providencia: The working in this place has no change from last week.

Mina Grande: The west branch is still looking well; no change to notice.

We have not yet begun to work in the 12 fm. level, as the ground and stalks above are still dripping a great deal of water yet, which is falling into the winze, and would cause us to want to sink, but this water must drain off in a few days, when we shall commence to work in this winze. The water is now in fork in the Mina Grande shaft.

If possible, more solid as it goes down, as well broken from it so that it is not.

Providencia: The working in this place has no change from last week.

Mina Grande: The west branch is still looking well; no change to notice.

We have not yet begun to work in the 12 fm. level, as the ground and stalks above are still dripping a great deal of water yet, which is falling into the winze, and would cause us to want to sink, but this water must drain off in a few days, when we shall commence to work in this winze. The water is now in fork in the Mina Grande shaft.

If possible, more solid as it goes down, as well broken from it so that it is not.

Providencia: The working in this place has no change from last week.

Mina Grande: The west branch is still looking well; no change to notice.

We have not yet begun to work in the 12 fm. level, as the ground and stalks above are still dripping a great deal of water yet, which is falling into the winze, and would cause us to want to sink, but this water must drain off in a few days, when we shall commence to work in this winze. The water is now in fork in the Mina Grande shaft.

If possible, more solid as it goes down, as well broken from it so that it is not.

Providencia: The working in this place has no change from last week.

Mina Grande: The west branch is still looking well; no change to notice.

We have not yet begun to work in the 12 fm. level, as the ground and stalks above are still dripping a great deal of water yet, which is falling into the winze, and would cause us to want to sink, but this water must drain off in a few days, when we shall commence to work in this winze. The water is now in fork in the Mina Grande shaft.

If possible, more solid as it goes down, as well broken from it so that it is not.

Providencia: The working in this place has no change from last week.

Mina Grande: The west branch is still looking well; no change to notice.

We have not yet begun to work in the 12 fm. level, as the ground and stalks above are still dripping a great deal of water yet, which is falling into the winze, and would cause us to want to sink, but this water must drain off in a few days, when we shall commence to work in this winze. The water is now in fork in the Mina Grande shaft.

If possible, more solid as it goes down, as well broken from it so that it is not.

Providencia: The working in this place has no change from last week.

Mina Grande: The west branch is still looking well; no change to notice.

We have not yet begun to work in the 12 fm. level, as the ground and stalks above are still dripping a great deal of water yet, which is falling into the winze, and would cause us to want to sink, but this water must drain off in a few days, when we shall commence to work in this winze. The water is now in fork in the Mina Grande shaft.

If possible, more solid as it goes down, as well broken from it so that it is not.

Providencia: The working in this place has no change from last week.

Mina Grande: The west branch is still looking well; no change to notice.

We have not yet begun to work in the 12 fm. level, as the ground and stalks above are still dripping a great deal of water yet, which is falling into the winze, and would cause us to want to sink, but this water must drain off in a few days, when we shall commence to work in this winze. The water is now in fork in the Mina Grande shaft.

If possible, more solid as it goes down, as well broken from it so that it is not.

Providencia: The working in this place has no change from last week.

Mina Grande: The west branch is still looking well; no change to notice.

We have not yet begun to work in the 12 fm. level, as the ground and stalks above are still dripping a great deal of water yet, which is falling into the winze, and would cause us to want to sink, but this water must drain off in a few days, when we shall commence to work in this winze. The water is now in fork in the Mina Grande shaft.

If possible, more solid as it goes down, as well broken from it so that it is not.

Providencia: The working in this place has no change from last week.

Mina Grande: The west branch is still looking well; no change to notice.

We have not yet begun to work in the 12 fm. level, as the ground and stalks above are still dripping a great deal of water yet, which is falling into the winze, and would cause us to want to sink, but this water must drain off in a few days, when we shall commence to work in this winze. The water is now in fork in the Mina Grande shaft.

If possible, more solid as it goes down, as well broken from it

be found to
The ore in this
In the cross-
hopes that the
are in the dis-
sider. We
no water, until
week. In the
Grand next
week of the 12,
south slide;
prudent to say
works we found
we have un-
and last night
no opinion
opinions I
and it gives
In order
or some little
the side. By
out of its course,
will start the 24
try to say the
all stoppage away
the 42 devot-
de on the level
in the slide
use it was one
from his
he thought
year better than
had been
; but when
laid a loss of
be seen that
that, owing to
which time the
would explain
itself, and was
was built at
the ore, and the
employment; she
and the loss
small amount
honer Provi-
to the issue of
it was a year
they was real-
fully under-
before the di-
be raised on
serve to meet
the property
serve for any
spent simply
erworks, had
any in a sim-
conclusion, the
was a good
to the com-
not see that
company. He
The sixtive
understood
profitable re-
tive might look
shares that it
Not doubt
the company,
the again the
deposit at the
re on its way
of pitman
ame home in
tal, by which
that Mr. Breach
on the re-
er, Col. Wil-
his staff for
the mine, and
ack ore, and
holders re-
a bare vote of
ings.

the com-
chair.
the meeting.
ough illness,
on to say
very little
exception
recently re-
ng having
to hold it;
opt the re-
the share-
nts. —A
on the ex-
the directors
the money
every month
the gold was
on assayed
the returns
ference be-
sent home
the amount
of the gold.
parate item
and accounts,
y, who had
muneration
ch have been
ished in the
g, but on an
history.
ake up their
deal of so
upon his
par, and the
not the least
e all mining
capital had
confidence
in the zeal with
a short time
had remitted
as possible,
1000\$, but
erts from the
ton of lode,
and in some
1 oz. per
in that d-
in putting
able him to
the past Capt.
which had been
instruction
in the pur-
investment.
not put on
s. Captain
ould be glad

THE CHAIRMAN said that Capt. Thomas was in the position of a co-partner, and therefore was interested in doing the best he could for the company. The operations at the mine had been conducted as economically as possible. There was a very small debt at the mine, and that would be paid off out of the returns. The money sent out from this country would be employed exclusively in pushing on the works.

A SHAREHOLDER asked what was the price obtained for the gold?

The SECRETARY said the directors had not only had specimens of gold sent over,

but also a bar of gold, and it fetched about the same price here as there. The

price obtained was about 55s. to 57s. per oz.; but, of course, that contained a pro-

portion of silver. When the silver was taken out the full price was obtained for the gold. —The meeting then broke up.

FLAGSTAFF SILVER MINING COMPANY OF UTAH.

A meeting of the debenture and promissory note holders in this company, convened by Messrs. Vincent and Garne, was held at the Cannon-street Hotel, on Thursday,

Prof. VINCENT in the chair.

The CHAIRMAN opened the meeting by calling attention to the present fiscal difficulties of the company and the cause which had led to its present embarrassment. He referred at some length to the difficulties which had arisen between himself and Mr. Garne, and the other members of the board of directors, and was proceeding to explain the circumstances under which the mine had been seized by a creditor, when —

A SHAREHOLDER enquired whether it was true that the property had passed into the hands of the creditors without power of redemption by the company?

Mr. SWELL thought he could, perhaps, save the time of the meeting if he read a letter which appeared in Salt Lake paper of Dec. 9, which he had only that morning received written by Mr. Lycurgus Edgerton. By the letter it appeared that the mine been seized only in respect of an unpaid instalment of \$4999.33, and the writer gave it as his opinion that on payment of this sum the creditor would be bound to hand back the mine to the company or its representatives, and in this opinion Mr. Swell concurred.

The CHAIRMAN said the letter anticipated the remarks he was about to make, and gave more correct data than he, perhaps, could have been able to do. It was monstrous to suppose that a mine well worth 250,000£, would be permitted to remain in the hands of a creditor for a sum of about 800£. It was of the greatest importance at the present crisis that the debenture and promissory note holders should consent to give some time—say, three months, for the payment of the interest, which would be due to them on Jan. 1, and he hoped that in the interval, with the reconstruction of the board, the present difficulties would be surmounted, and the company enter upon a career of prosperity.

Mr. FIDLER suggested the appointment of a committee to consider what steps could best be taken, and to request the debenture holders to postpone their interest coupons for three months, and he subsequently moved a formal resolution to that effect.

Mr. VINCENT seconded the resolution, and it was carried unanimously. Messrs. Vincent, Garne, Fidler, and Quinlan, being appointed the committee, Sir Leopold Hall stating that it had been said he was only seeking the solicitorship of the company, but that had such been his desire he might have been appointed either the solicitor or a director at the suggestion of Mr. Harvey, the present Chairman, but he declined both posts. Ultimately, however, Mr. Swell's name was added.

The CHAIRMAN then referred to the informal resolution claimed to have been passed at a meeting of shareholders, promissory note and debenture holders, on Dec. 7, and said that for the purpose of clearing up any doubt, if such existed, that the resolution was not in order, he would formally move that the resolution be and is hereby adopted and confirmed.

Mr. BACON seconded it, and it was carried with one dissentient.

The customary vote of thanks to the Chairman brought the proceedings to a close.

MALPASO GOLD WASHING COMPANY.—At the meeting of shareholders, yesterday, the report of the directors was adopted. The result of the past year's working has been a great disappointment to the directors, but reports received since the publication of the accounts lead to the hope that better times may shortly be expected. A report will appear in next week's Journal.

MALABAR GOLD WASHING COMPANY.—The report of the directors was adopted at the meeting of shareholders yesterday. The position of the company at present is such that with even a small improvement in the value of the gravel a fair profit will result. A report will appear in next week's Journal.

RUSSIA COPPER COMPANY.—At the annual meeting yesterday the report and accounts were, after a short discussion, adopted, and at the extraordinary meeting which followed, the voluntary liquidation (prior to a re-construction) of the company recommended by the directors, was unanimously approved, and Mr. Mackay (of the firm of Messrs. Robert Fletcher and Co., the managers of the company) was appointed a liquidator. Mr. Mackay has already, upon the petition of one of the debenture holders, been appointed a receiver of the company. It was also decided that Mr. Mackay should proceed to Russia to make a thorough investigation of the affairs of the company, and upon his report the directors will base their positions as to the future of the undertaking.—[A detailed report of the proceedings will appear in next week's Journal.]

Original Correspondence.

FLAGSTAFF SILVER MINING COMPANY OF UTAH.

Sir.—I am directed to inform you that the meeting of debenture holders, held yesterday, was convened without previous communication to, or authority from, the board. It consisted of only about 35 persons, some of whom were neither debenture-holders nor shareholders. I send you herewith copy of letter received from the manager of the mine for publication.

A. A. DE METZ, Sec.

London, Dec. 25.

Salt Lake City, Utah, Dec. 1.—Gentlemen: Yours of the 9th inst. with Bay City Tunnel lease and letters received. I had not seen but knew of the existence of such a lease. Patrick was working on the tunnel under the lease when Hunter took possession, and Hunter did not immediately notify the parties to cease work. It is on account of the labourers' wages that Tucker procured his judgment for about \$2200, before reported, by having received from the labourers' assignments of their claims. These labourers had been employed by Cullins under Patrick's directions, and they had executed about 100 ft. of tunnel towards the Flagstaff Mine. The Bay City Tunnel is situated to the east of Flagstaff, and runs north towards the Emma. Patrick's plan was to run from the line of Bay City a branch tunnel about 1600 ft. to the Flagstaff working shaft, cutting the same, but 400 to 500 ft. deeper than it now is. This branch tunnel would run mostly through the ledge, and be fair easy working. I think some such scheme a good one, but his plan was not a good one. First, he paid too much royalty, it should have been not over 50s. per ton, next he should have interested the other mineowners along the line of the lode, and had them share the expenses.

Such a plan as this I was talking of with the other mineowners, and it could easily be carried out. My only reason for not suggesting the matter to you, and pushing it, has been the uncertain conditions of our affairs. I say without any hesitation I think if we had our title perfected and were out of debt it would be a profitable plan for us. We should thus be able to work our mine 400 to 500 feet deeper without pumping water or holding ore; all the power we would need would be for running the drills, which would be very small. But of course, in the present state of matters it is useless to try to make any arrangements. As to the great discoveries referred to in the *Mining Journal*, as stated in the slip attached to yours of the 9th, there is no foundation for it whatever. The *Journal* correspondent is much like the correspondents of our mining papers here. As I have written you recently, the mine is looking very well now; there are large bodies of ore of fair grade in sight as to amount in tons or money, I cannot venture to say for the reason I have before stated—that the ore bodies are likely to cut off suddenly. The only foundation for reports of rich and large ore discoveries is such as grows out of the Nabob location, in which considerable good ore has been found. I cannot tell the amount, but it is much better grade than lower in the mine. All the surface deposits have been higher grade, running from 240 to 280 per ton. We have for some days past been trying injunction suits. The following locations have been made on the Flagstaff lode, but outside the ground covered by the patent—July 4, 1877, Nabob, by Boatman, Barnes, and Bell; August 10, 1877, Virginia, by Ellers; Oct. 25, Nabob Extension, by McDonald, and are situated as follows, surrounding the places marked Nabob Dia. [A diagram is here inserted, showing the Virginia claim to cross the Flagstaff patent nearly at right angles, while the Nabob falls into Virginia (at an angle of about 25°) outside the Flagstaff patent. The Nabob Extension crosses the Flagstaff patent at nearly the same angle as the Virginia.] The Nabob Extension is where the large body of rich ore is, and concerning which the injunction suits were. McDonald was working in his Discovery shaft and we in the long crooked shaft. He asked an injunction against us from working on his Nabob Extension claim. Billing asked against him, because he was entitled to the ground, because it is the same lode into the Flagstaff lode, and also because it is on the Virginia ground, while Billing held by lease from Ellers.

The judge did not make any decision involving the rights of the Flagstaff, but decided solely upon the ground that the Virginia is an older location than the Nabob Extension, and restrained McDonald from working, and allowed Billing to continue. Of course this leaves our rights as opposed to the Nabob unsettled, and the judge holds to the doctrine that we have no title to the lode outside of our patent, and the Nabob being older than the Virginia, we probably would be defeated before him. In addition to the locations named, there is an old one indicated by dotted lines called, I think, the Plymouth Rock; this claim was located several years since on, it is claimed, a cross vein, and I am told the work has been kept up, so it is a valid claim. I tried to buy it to fight the Nabob Extension, and the party offered to take \$5000, but Billing could not raise the money, and was unwilling to do it. I then tried to persuade the party to let us have the claim, and then carry it through, and then pay him a large amount out of any success we could make out of it, but this he refused to do, and thus I had to let it pass into the hands of a capitalist, who is now carrying it, and I fear it will give serious trouble. The discovery of this ore at the Nabob has proved a most serious matter, unless we can hold the ledge under our patent there is but little left us; this, however, is a mixed question, but if the Supreme Court will so hold we will then sweep the hill, otherwise we shall have but little. I have before written you fully concerning the condition of the title. Billing is not yet in condition to meet the demands on him. As matters now appear I have no idea he will attempt to meet

the interest on debentures, your draft for \$1250 is not paid; he does not say he will not pay, he promises everything, but he does not and cannot pay. He does not think of paying us who are almost constantly engaged in defending and keeping him and the company. His brother will soon be here. I hope he will bring money and some change here. Your despatches to Billing aroused his suspicions that I moved, as I cannot avoid without utter neglect of my duty, yet I think it better not to report to him what I say. If he can wash through it is better without friendly feeling, but he has so flagrantly failed to carry out his contract I hardly see a clear way to its continuance.

As to what should be done is a matter for you to determine. If his brother does nothing better on his arrival a change must be made, for a continuance of this will leave nothing for the company or anyone; and my opinion, as before expressed, is there is little prospect for the company to ever pay off its immense debts and hold the property. My opinion still is that the only way is for the bondholders or any individuals there who have some claims or interest in the property to come and on their own account procure title to the property, which I consider can not be done for an amount so small that it may soon be repaid out of the mine. But I would not advise any action upon correspondence. It would be best for parties acting to come here, for there are many complications to be considered. I regret to be obliged to advise such a course, but I cannot now see any encouragement to hope the Flagstaff Company can ever pay its way out.—J. H. BEATTY.

F.S.—Our shipments for month will send as soon as statement is complete.

LLANRWST MINE.

SIR.—I this day received a communication per letter, which letter can be produced if requisite. I shall feel obliged if you will find space for it in your publication for to-morrow. It is dated Dec. 27, and reads thus: "Seeing some letters of yours on the above mine in the Journal, the following may be of some use to you. My father met the dresser of the adjoining mine yesterday, and he stated that the manager and Mr. Endean valued the ore at surface before starting the dressing machinery at 400 tons of clean ore. When dressed it made only 100 tons. They had the latter end of last week other 10 tons dressed, and that the mine is looking very poor. Should the above account be correct it is not to be wondered at that the secretary refuses to reply to, or even acknowledge, the receipt of an application for an order to inspect the mine. It may not be generally known that the office of the company is none other than the office of Mr. J. P. Endean, and I have very good reason for saying that the secretary of the company also acts as a clerk to Mr. Endean, who, no doubt, is the cause of the secretary not supplying an order to inspect the mine. It is an undeniably fact that anyone can inspect the mine with Mr. J. P. Endean's authority—a proof that there is no necessity to await an order from the directors."

GRANVILLE SHARP, 2, Gresham Buildings, Basinghall-street, Dec. 28.

LLANRWST MINE.

SIR.—I will thank you to give publicity to the following:—On the 19th instant I sent into the comp'ty's office a transfer with certificate for 100 shares into my own name, with a written request to the secretary, Mr. James Carter, for an order to inspect the mine. I have since written twice to Mr. Carter for an inspecting order, and up to this moment no reply has been sent. During the whole course of my business life—since 1852—I have never met with the like experience. The following gentlemen are the directors of the company:—Capt. A. S. Gilbert, Ivy Lodge, St. John's Wood; Major G. Winton, South Norwood; and Mr. B. J. C. Hilden, Cambridge Villas, Southend. Possibly these gentlemen are not aware of the negligence of the secretary, and unless the order to inspect is forwarded I will take legal proceedings against the company to compel a recognition of my demand, which every shareholder is entitled to. I am determined to know whether the reports upon this property are truthful. I simply want the facts. If the mine are turning out so marvellously rich as certain firms persist in stating, there should be no difficulty in a shareholder obtaining an order to inspect. My conduct is not base and malicious, neither is it my desire to force down the share (as stated by one of the Llanrwst firms) with a view of recommending other shares. Such acts may accord with some persons' views, but are beneath mine.

H. GOULD SHARP,

Stock and Share Broker.

[For remainder of Original Correspondence see this day's Supplement.]

FOREIGN MINES.

ST. JOHN DEL REY.—Telegram from Morro Velho, dated Rio de Janeiro, Dec. 24: Profit for the month of November, \$700.

DON PEDRO.—Telegram from Rio, dated Dec. 26: Produce cleaned up (first division of December), 1650 cts.: 60-ft. iron wheel (for driving the permanent pumping machinery) set to work to try machinery and adjust balance, &c.

RICHMOND CONSOLIDATED.—Telegram (from the mine at Eureka, Nevada)—Week's run, \$80,000, from 1070 tons of ore (three furnaces); week's produce of refined, \$47,000.

R. RICKARD, Dec. 5: The 200 drift is now broken up ground, which consists of limestone and low-grade ore. The winze sinking below this level is down 60 ft. The bottom is in low-grade ore; we have been obliged to suspend the sinking for lack of air; we are putting in a hand-fan, which will be ready to work to-morrow, when sinking will be resumed. The cross cut from the 60 ft. 400 drift is still in good order; we shall now begin to raise it. The 400 drift is not looking so well as it was, the air in the western end is narrow, and the drift started from rise in a westerly direction is at present unproductive. The drift north from the west end of the 400 is also unproductive. The 600 cross-cut is improved in appearance; for the last 20 ft. it has been in ore matter, and on a well-defined fissure; I am expecting we shall strike ore in this drift shortly. The 600 is without change; we expect to cut the quartzite again shortly. There is also no change in the 80 drift on quartzite. The winze in the 900 has been sunk 15 ft. in very favourable ground; the fissure is still well-defined and regular. The furnaces and refinery are going on satisfactorily.

TOLIMA.—Dec. 26: The Frias October returns show a profit of \$152,14s. 8½d. The manager in speaking of the Frias Mine, says—"I am delighted to say this has improved more rapidly than I could have expected on, and to a greater extent; it is now in a first rate paying condition, and there is every reason to believe we are on the branch of ore respecting which I wrote you two months ago. I thought we were in the vicinity of. There is no fear of the future now."—Surface Department: After a few alterations in the working of the jiggers we succeeded in increasing the mineral sufficiently rich for export. The best work obtained from these ore was worth 432-82 ozs. per ton; the second gave 179-66 ozs. per ton. The tailings remaining are rich enough to be treated again, but at present we have no machinery to do so.

FRONTENAC MINING AND SMELTING.—Mr. Kilshaw, the manager at the smelting-works, writes:—Since my last we have received 6 tons of lead ore, which I am glad to say averages 8 per cent.—a great improvement on all previous lots. This is the best dressed ore received. The road is in such bad condition that no ore will be able to come in for a week or two.

MINERAL HILL.—Nov. 30: Queen Tunnel: The parallel extension of this tunnel is 55 ft. from the old end; this distance has been gained by stoping and driving. During the past week we have daily met with patches of quartz charged with galena; the ground is changing, and getting more easy for driving, and more favourable to the existence of ore. In the Cave the quartz ledge still holds out; it is apparently widening, and we rise on it. We are still breaking waste, and have broken but little ore of late. It will take another week to open it out to work properly.

Dec. 6: Queen Tunnel: The ground is still improving, and the quartz patches still continue mixed with galena and a little chloride of silver, and if these indications do not deceive us we are near ore in more or less quantities. The Cave the quartz is increasing in size, but its present face is poor; however, I intend to follow it, as it is our only chance of finding ore.

MALABAR.—G. B. O'Reilly, Nov. 19: On the 12th inst. we finished our change of distributor and monitor, and resumed work under far more favourable conditions than hitherto. Up to date of writing we have been enabled to run fully 20 hours out of the 24, and should no unforeseen circumstance occur I think we shall be able to get in a full run within the month. The point we are now operating on is comparatively free from the obstructions so often alluded to, and I am now fully convinced that the gravel on this line is of far better quality than that to the right.

A couple of runs in this direction will enable me to form a decisive opinion. I feel very great confidence that we shall far more than meet all expenses, and such being the case I will use every effort to push the work day and night. As usual our work has proceeded with the greatest regularity. Our change of rig was effected in a very thorough manner, and worked well from the moment we turned the water on. We have had no breakages of any sort to notice, and only some slight interruptions from heavy rains. It is satisfactory to me to assure the board that I think there is now no immediate cause for entertaining the contingency of our being unable to cover expenses. I shall clean up the sluice on the 16th or 17th prox., and hope to get in 500 hours at least.

MALPASO.—W. S. WELTON, Nov. 19: Run No. 40 from Oct. 20 to Nov. 17: The clean up after this run, during which washing was carried on for 410 hours with a head of water of 500 in., produced from the upper sluice 213-40 ozs. of amalgam; from wheeling into the lower sluice 61-90 ozs.; total amalgam obtained, 275-30 ozs.; valued at \$1933-25 (86d.). The gravel wheeled into the sluice appears to have given as good a result as last, considering the delays that have taken place in running. The gravel at the head of the sluice continues of the same quality as last, and our returns will improve when we are able to run full time. I shall write the board again on the 28th inst. upon the state of the mine.

—New Opening: The opening we have commenced is situated at about 200 ft. to the east and parallel with the present sluice, coming in about 30 ft. below the present sluice, and is the one the late superintendent was preparing to carry into effect. So far very little progress has been made, on account of the very large quantity of waste, and the bottom being thickly covered with large boulders. To-day I have taken advantage of the opportunity (whilst the cuts are being got down to put in some 50 ft. of new sluice at the head) to turn in all our supply of clean water to see if the greater portion of the waste can be run off along the line of the new opening; as, if this cannot be done, it will take more than a year to bring up this opening by any other means, and we may have to content with less than 30 ft. gain in grade for the present.

PESTARENA UNITED.—Dec. 24: District Pestarena: The lode in the 100 north is much the same, giving 1½ ton of ore per fathom, but an improvement may be expected in this end shortly, because in the winze in the 90 we have a lode giving 1 tons of rich ore per fathom, and the line of which will be reached in the 100 end north. The lode in the 100 end south is giving now about 6 tons per fathom; worth about 2 ozs

WATSON BROTHERS' MINING CIRCULAR.

Ten years ago the weekly information which had previously been published for a great number of years in WATSON BROTHERS' Mining Circular was transferred to the columns of the *Mining Journal*, with the following announcement; which is now reproduced in consequence of the numerous letters and enquiries handed to them of late in reply to one which appeared in the *Journal* on the Clementina Mine.

The great extension of mining business, the difficulty so often complained of by country shareholders in getting accurate and disinterested information as to the state of Cornish and Foreign Mines, and of the financial and real position of mining companies generally, have induced Messrs. WATSON BROTHERS to make their Circular now published in the *Mining Journal* more extensively known, and to state:

That they issue daily to clients and others who apply for it a Price List (as supplied to most of the London and country papers), giving the closing prices of Mining Shares up to Four o'clock.

They also buy and sell shares for immediate cash or for the usual fortnightly settlement in all Mines dealt in on the Mining and Stock Exchanges, at the close market price of the day, free of all charges for commission. They deal also on the same terms, in the Public Funds, Railways, Telegraphs, and all other Securities dealt in upon the Stock Exchange.

Having agents in all the mining districts, they are constantly getting mines inspected for their own guidance, and will also obtain special reports of any particular mine for their clients, for the inspecting agent's fee of £2 2s.

In the year 1843, when mining was almost unknown to the general public attention was first called to its advantages, when properly conducted, in the "Compendium of British Mining," commenced in 1837, and published in 1843, by Mr. WATSON, F.G.S., author of "Gleanings among Mines and Miners," "Records of Ancient Mining," "Cornish Notes" (first series, 1862), "Cornish Notes" (second series, 1863), "The Progress of Mining," with "Statistics of the Mining Interests, annually for 21 years, &c., &c., &c." In the Compendium, published in 1843, Mr. WATSON was the first to recommend the system of a "division of small risks in several mines, ensuring the success in the aggregate," and Messrs. WATSON BROTHERS have always selected this on hand. Perhaps at no former period in the annals of mining has there been more peculiar need of honest and experienced advice in regard to mines and share dealing than there is at present; and from the lengthened experience of Messrs. WATSON BROTHERS they are emboldened to offer, thus publicly, their best services and advice to all connected with mines and mining.

Messrs. WATSON BROTHERS are daily asked their opinion of particular mines, as well as to recommend mines to invest or speculate in, and they give their advice and recommend mines to the best of their judgment and ability, founded on the best practical advice they can obtain from the mining districts, but they will not be held responsible, nor subject to blame, if results do not always equal the expectation they may have held out in a property so fluctuating as mining.

WATSON BROTHERS,
MINEOWNERS, STOCK AND SHARE DEALERS, &c.,
1, ST. MICHAEL'S ALLEY, CORNHILL, LONDON.

1877.—It would be a waste of time and trouble to write a long and elaborate review of the past 12 months. A few words may describe it as almost barren of good results and full of disappointing and disastrous losses. The success of mining depends on the price of metals; the price of metals on the activity of trade and—the will of the smelters! And throughout the past year trade has been bad and the smelters have had their own way. Tin has been at almost its lowest known point, and tin mines have been many abandoned, and all neglected. Copper has declined, so that only few mines can pay their expenses; and lead has, contrary to expectation, dropped 3/- to 4/- per ton. Dividends, therefore, have been less than usual, and discoveries few and far between.

Let any of our readers take up the Share List, and look it carefully, and he will see how few have been the changes for the better during the past year. It is true there was a sudden burst in tin mines a few months ago, and an enormous rise took place—on paper. Of actual business, or actual benefit to shareholders, there was in reality very little, and the temporary spurt soon came to an end. We have had one good discovery, and a great advance in a lead mine, but this being in few shares and in few hands the market has not been benefited by it.

At the early part of the year North Laxey were in great favour at a guinea; the directors had a large sum of money in hand, and now it is said to have been spent, and shares are at 5s. East Van were at 10. Glenroy at 35s. Devon Great Consols, 4s; Creb, 3s; Van, 3s; Roman Gravels, 1s; Tankerville, 8s; Leadhills, 6s; Tankerville, 1s.

This is the gloomy side of the picture; let us wipe it out with the old year!

On the other hand, South Condurrow rose from 6 to 10, Wheal Peevor 3 to 6, Grenville 5s. to 4s., Herodsfoot 3 to 8, Clementina 20 to 40, D'Eresby 20 to 50.

Much of the depression in the past year, and consequently the fall in the prices of the stocks, has been owing to the want of general business and the great absence of speculation; these, again, may be traced to the fears consequent on and arising out of the war. People have held back their hands and their money, waiting to see what would turn up. Thus large sums are now waiting for investment when the time shall come. And when we look to the future, much will depend on peace or war. After the Crimean war there was a great rise in metals; the wasted products of years had to be replenished, large profits were made by the miners, and a good business done in shares. Will history repeat itself in 1878? We hope it may, and think it will. The enormous waste of material which has been going on for the last twelve months in lead, in copper, in tin, in iron, must be made up if another campaign is to be undertaken in the spring, and if there should be peace, which we all desire if it can be gained without damage to our own interests, such a fillip will be given to trade and to speculation that mines with merit in them must and will advance. It will be our object from time to time to point these out in the best way we can, never forgetting that all mining is uncertain, and that even the best judgments are liable to err.

We had an idea at the beginning of the year that lead mines would be its prominent feature; and, on the whole, they have been so, though not to the extent we imagined, owing, first, to the fall in lead; and, secondly, to the circumstances above referred to.

We take a natural pride in D'Eresby Mountain, and as it has somewhat brightened the past year for our friends so will it be, we think, the great star of 1878. The mine arose out of Clementina, which was started on the principle of having a small number of shares, and of all going in alike, and those who joined us have made, or have been able to make, very large profits in a very few months. We have so often described D'Eresby in this place that we need not enter fully into it now; a few weeks will show whether the Gorse lode, discovered in No. 4 adit, is as good in No. 5. 20 fms deeper; if so, the shares will be subdivided, and those who have bought, even at 50 to 60, may be able, probably, to double their money, and the mine may soon get into good returns and profits. The district is full of lead, and is likely to become prominent; we are in treaty, therefore, for a mine which may be equal, we hope, to D'Eresby, and which if we succeed in getting will be divided into the same number of shares (512) of 20/- each.

Among other mines already in the market there are many which, it seems to us, must have a great rise in a few months, and these should be purchased now they are low, and at heavy discounts.

To some of them we may, probably, refer in our next.

COST-BOOK.—We have no time to refer to this matter this week. CLEMENTINA.—The lode in the winze below the 25 has again improved to 1 ton per fathom.

D'ERESBY.—No particular change here; about 18 tons of lead have already been broken by the limited operations on the Gorse lode, and we hope to have a good parcel by the time the crusher is ready.

GLENROY.—The lode in the shaft is improving in size and appearance. We have great hopes here, though shares are at a heavy discount.

Messrs. PIXLEY AND ABELL.—GOLD: The demand for gold has not been active during the week, and out of the arrivals mentioned below 355,000/-, in bars and coin, have been sent into the Bank; 50,000/- in sovereigns have been withdrawn for Egypt, and a great part of the balance remains to be dealt with. The German has brought 17,500/- from the Cape, the Peninsular and Oriental steamer 419,400/- from Australia, the Chimbora 51,000/- from Australia—total, 479,000/- The steamer takes 45,520/- to the East.—SILVER: In consequence of the holidays the market has been very quiet, and although transactions have taken place at 54/- per oz. since our last circular the price can only now be quoted as 54/- nearest, the council drafts on India not having gone as high as was expected. The

arrivals have been large, comprising about 497,000/- from Germany, and about 35,000/- from New York. The Peninsular and Oriental steamer takes to-day 32,360/- to India.

1877.

The year opened with the Bank rate at 2 per cent., and money remained so long a drug that capitalists diverted it into new channels. A rise to 5 per cent. brought a large portion of it back, but hard coin is still anything but plentiful, and many a house has been hard pushed to find a small sum like 20,000/- or 30,000/-, on a sudden emergency. More than once, a degree of anxiety has been shewn respecting the withdrawal of a small parcel of bullion, altogether unbecoming the World's City. Three or four of our leading banks have, probably, not less than one hundred millions on deposit, and what has happened on a thousand part of it being exported?

An ordinary Pickford van entering the Bank of England yard takes up a few iron-bound cases, and is quietly driven away. The intelligence flashes through the city that 100,000/- has been withdrawn. The "tape" in communicating this to 200 different offices, gives at the same time a lower price for Consols, with other stocks and "things" leave off "flat."

The rupture between Russia and Turkey showed, as Ricardo long ago discovered, that in Stock Exchange matters the "rise" or "fall," as the case may be, is always over done. Before a shell had been fired across the Danube, Foreign Bonds and Home Railways were pushed down to a far lower price than they are now at, after a six months bloody struggle, with the same uncertain future.

In January Russians (1873) were over 81/-, but in May the price had fallen to 68/- Hangers-on begged some one to sell a "bear" for them—"they are going to 50/-, they are going to nothing." The end May settlement saw an entire change.

What is the fashion to style "a leading Hebrew firm," borrowed all the bonds they could get, and then exacted their own terms for lending them back to "bears." I well remember a client complaining because he had to pay a backwardation of 3/- per cent. I had been too hasty, and should have waited to see the turn of the market, he thought. Before the day was over no one could borrow for less than 3/- per 100/- bond, and all the time the eminent "Hebrew firm" were driving up the price, until 78/- was reached. The collapse of the "bears" was complete, and fourteen failures followed. During the same month of May, Turkish of 1871, rallied from 17/- to 27/-, and Egyptian Unifid from 28/- to 36/- We have been mercifully preserved this year by the Scotch from any severe fluctuation in Caledonian or North British. Reference was made in last year's article to the failure during one account of 29 members of the House, because they or their clients foolishly calculated the North British dividend too high. It is difficult to say what leads to this inflation year by year, the result always being disappointing. Metropolitan District were 4/- in January, but had receded to 3/- at one time during May. In November the stock was forced up to 5/-, and has since gradually receded. It is not worth buying by those who want the interest of their money to live on.

Similar fluctuations have taken place in Brighton "A" during the year, from 9/- to 12/-

Dover "A" has been as low as 10/-, and as high as 12/-

The recovery in Grand Trunk Securities has been in some instances over 50 per cent. Thus the First Preference recently touched 54/- but in June, were down at one time to 32/-, the Second then being no better than 21/-, and the Third Preference, 13/- York "A" has receded something like 25/- in value. East London Railway has been through disappointment. During 1876, a ruinous fall took place in the stock. At the commencement of the present year it was valued however, at 25/-, but is now difficult of sale at 15/- In the Miscellaneous Department Hudson Bay shares have suffered in value. Sellers have to be content with 10/- instead of 14/-, and no dividend has been paid during the year. Canada Land Company maintains the same price, although the shares have been paid down from 5/- to 11/- Brighton Aquarium has lost 4/- in value; Royal Aquarium gained 1/- Milner's Safe has fallen 2/- per share; National Safe has gained 30s. in value.

Turning to the Mining Market, we find that Exchequer shares are selling for very few more shillings than they were pounds at the year's commencement. The mysterious disappearance of the ruby silver ore has not yet been clearly accounted for, but everyone seems satisfied and contented, just as was the case some years ago, when Utah used periodically to burst up.

Chicago shares were selling at 6/- Argentines were quoted 4/- to 5/- but few could give a reliable quotation now of any description. Pontingland shares have risen 2/-, but Kapanga have declined from 4/- to 1 1/2/- There seems only a poor look out for those who bought Flagstaff at 4/- Richmond and Eberhardt are selling at nearly the same price, but the former has been down to 4/-, and the other to 5/- Steady foreign dividend lead mines such as Alamillos, Fortuna, and Linares, are practically unchanged, but the fall in the value of the ore has sent down considerably the price of Van, West Chiverton, Roman Gravels, and Tankerville. It is true that a few lead companies, not so well known as these, have been artificially buoyed up, but whenever realisation is attempted the fall will be unceasingly sudden. An instance of this has been seen during the present month of December. In January last West Chiverton shares were fetching 18 1/2/- Van, 40/-; Roman Gravels, 14/-; and Tankerville, 8 1/2/- It will be seen that the two latter have lost ground materially. The inevitable rally in lead shares cannot, however, be far off, and those who make a good selection are not likely to find cause for regret. There surely could not be much harm in buying at the present low prices Roman Gravels, Leadhills, Grogwinion, Pennant, Van, while Glenroy, Derwent, Padiors, East Chiverton, West Wye, Valley, and Rookhope are fair investments.

Within a less space than a month D'Eresby Mountain (lead) shares were dealt in at 15/- and at 5/-

Comparing the averages of former years, it would seem that copper has about touched its lowest point. The recent importance rise in Devon Consols and South Cadron may be taken as showing that others share this opinion. There are several mines that would come to the front once an improvement in the price began to show itself, among them would be West Tolgus, Mark Valley, Cape Copper, Penstruthal, South Crofty, Wheal Bassett, Wheal Agar, and Wheal Grenville.

As regards the leading tin mines, the prices of many are nearer those ruling at the commencement of the year than might have been imagined. It is little more than two months since the startling recovery set in. Obviously the reaction passed the proper bounds, but the highest and lowest reached during October and November are appended may not be found uninteresting:

Oct. 1	Nov. 6	Advance.
Carn Brea 229 0 0	239 0 0	£38 0 0
Cook's Kitchen 0 2 0	4 0 0	3 18 0
Dolcoath 25 0 0	43 0 0	18 0 0
Tinroft 10 0 0	20 0 0	10 0 0

Colliery shares keep firm, and it would not be surprising if an important rise took place next year. Only those constant by dealing in them can realise how tightly most shares are held, and how difficult it is to get holders to part at higher prices than those considered to be the current ones. To be sure, considering that Great Westerns have been 40/-; New Sharpstone, par; and Thorp's Gawber, 18/-, there is no inducement at present to create selling.

The Altamont Colliery, in North Wales, well known for the thickness of the seams and the freedom from water, is understood to be raising coal at a total charge (including every expense) of 4/- per ton. While this can be done there need be little fear of profits being made, however low coal may descend in price. Probably this is one of the best colliery investments out. There is a promising concern in South Wales—Newport Abercarn Colliery, shares which are now very low. They are of 10/- each, fully paid, and cost but little over 4/- By all accounts this will be one of the foremost collieries in the Principality, probably having a daily output of 1,000 tons of the Black Vein steam coals, which are yearly becoming scarcer and dearer.—FERNAND B. KIRK.

THE WEEK.

SATURDAY, DEC. 22.—Sellers of Flagstaff have now to be content with 15s., or less in some instances, there being so few buyers. Eberhardt's were offered at 7/-, and Richmonds at 8 1/2/- In the foreign department business was chiefly centred in Egyptian stocks, which continue to be bought in large numbers. The United closed to-day at 34 1/2/- being 3/- above the price this day week. Egyptian Preference, 54 1/2 to 54 1/2. In view of the settlement commencing on Monday Grand Trunk securities rallied somewhat. The First Preference recovered to 50/- the Second to 32, and the Third to 17, the price of the original stock being 8 1/2 to 9/-

MONDAY.—Taking the making-up prices as a basis the fall during the account in railways has been greatest in Caledonian, the next in order being Dover. A. The first named were continued at the mid-monthly settlement at 120/- to-day it was 118/- Dover, A, being 120 1/2, and now 117 1/2. The change in Brighton, A, has been from 119 1/2 to 117 1/2, and in Sheffield from 82 1/2 to 79 1/2. Grand Trunk First Preference, made up to-day at 50 1/2 as against 51 1/2. The change in Russian 1873 has been only from 77 1/2 to 77 1/2 (to-day). Last account Egyptian Preference were continued at 54 1/2, and the United at 34 1/2—today the prices were 54 1/2 and 34 1/2 respectively. Flagstaff are just half what they were, having fallen from 15/- to 15s. There was a marked decline in Brighton, A, and Caledonian, owing to stock being too plentiful. There is still apparently a large weak "bull" account open in

THESE lines.

TUESDAY.—Christmas Day.

WEDNESDAY.—Bank Holiday. Stock Exchange closed.

THURSDAY.—The markets opened devoid of any animation, many of the leading dealers being still away, and left off flat. Russian and Egyptian Bonds were forced down, and the business in railways consisted principally of sales. Dover, A, closed 1 1/2 per cent. lower. In mining shares some business was done in Flagstaff at 7/-, in Kapanga at 1 to 1 1/2, and in Eberhardt at 8. To-morrow will conclude the settlement.

FRIDAY (Opening).—With the exception of Districts, where a decline has taken place, the railway market is disposed to be firm, the principal movements being in North British, though the amount of business doing is not large. Herodsfoot shares are quoted 10 to 12/-, or 2/- higher, and very few are offred. South Cadron 5/- higher (85 to 90); the dividend declared was 2/- per share. Llanwari are very flat.

TUESDAY.—At one time from rumours being put in circulation that an armistice was probable Consols rose as much as 2/-, but the price is now only 1/2 per cent. better than last night. British have improved 1 1/2/- and Midland 2 1/2. Carn Brea, 42 1/2 to 45; Cook's Kitchen, 2 to 2 1/2; Devon Consols, 3 to 3 1/2; Dolcoath, 33 to 35; East Van, 3 1/2 to 4; Glenroy, 7 1/2 to 1; Leadhills, 4 1/2 to 4 1/2; North Laxey, 5s. to 7s.; Parry Mountain, 2s. to 11s.; Penstruthal, 5s. to 7s.; Port Phillip, 5s. to 7s.; Patleay Bridge, 3s. to 3 1/2; Four o'clock.—Districts have been fluctuating, but are now comparatively steady at 53 1/2. Roman Gravels, 7 1/2 to 7 1/2; South Frances, 2 1/2 to 3; Wheat Gravels, 3 to 3 1/2; Hill paid; Chapel House, 2 1/2 to 3 1/2; Pelsall Coal, 2 1/2 to 3; Newport Abercarn, 3 1/2 to 4 1/2.

FERNAND B. KIRK.

MINING NOTABILIA

[EXTRACTS FROM OUR MINING CORRESPONDENCE.]

LIVINGSTONE CONSOLS.—The operations are in a part of the mine which is supposed to be very valuable by those who are competent to judge. It is stated on excellent authority that it is one of the best places to open up a mine, and that they will find ground that will let on tribute at the present price of tin. It is affirmed as probable that a paying mine will be opened up on a small outlay.

Mining Correspondence.

BRITISH MINES.

BETTWYS-Y-COED.—H. T. Haley, Dec. 24: Early last week we pumped the state of the pump and water-wheel. We have repaired the water wheel, and prepared a small pump to commence sinking next week. While we were engaged about the water wheel I put the shaftmen to clean up the bottom or the 20, and get it in order for driving east, where the lode is of a kindly nature, and producing 1 1/2 ton of lead per fathom. No other point to notice.

BLUE HILLS.—S. Bennett, A. Gripe, Dec. 24: The 80 cross-cut north has passed through the top lode, and although very small it is very good, and with 5 ft. to 6 ft. per ton we would pay to stop away. The main lode in the 80 east is 4 to 5 ft. wide, and although continuing good stones of tin, and altogether of a good promising character, is not of much value. On the north side the 30 east is poor; in the winze below this level the lode is worth 6/- to 6 1/2 ft. per fathom; the 80 is the most suitable position for this lode, has been cleared out, and found about 8 ft. below the adit level.

CAMBRI

yielding 1½ ton of ore per fathom—the same as it yielded above. The third branch, west of No. 1, has been a little better this week; it is yielding 10 cts. of ore per fathom. The stopes on No. 2 cross vein is just up to the new east and west vein, where it turned poor below. We shall rise up now for another stop, which will bring us to the top of the limestone; this stop will yield 8 or 10 cts. of ore per fathom. The new water-way is now close to the branch we expect to drive in; we may break into it any day, and I expect we shall find out in it. The working below the adit north is in very disordered ground at present; it has been altogether soft, mixed with ore, but they have come on clean limestone, and it is yielding 8 cts. of ore per fathom. The top of the branch crossing Five Away is yielding 10 cts. of ore per fathom. The end of Five Away east is still jointed, and better for driving; there are some indications that we shall have some more strength crossing this end soon. No change in the end of the cross-cut south from the adit level; the beds are still rising a little.

HARWOOD.—W. Tailleur, Dec. 21: Hardship. We have commenced to drive east to intersect another north and south vein, which will probably be within 8 or 9 fms. from the present work. The veins that have been out here do not in any way correspond with the one named; it is a strong and powerful vein, and has a throw opposite to the one last cut. When formerly worked it was very productive in the upper soils. The north end is poorer; several strings have crossed the vein, which, if driven through, will be likely to cause more ore. We are proceeding with dressing as quickly as possible.

HINGTON DOWN.—T. Richards, Dec. 27: There is nothing new in the mine to advise you of this week. We shall sample to-morrow about 170 tons of better quality ore.

HOLMBUSH.—H. Bennett, Dec. 27: All the underground operations remain without change since last reported on. Next Saturday being out monthly setting a full report shall follow.

KINGSTON CONSOLS.—Dec. 27: The lode in the 40 west still continues large and

mastery, composed of capital stones of lead and blende—very promising lode.

Good progress has been made in driving the 30 west; the lode is worth 1 ton of blende and 5 cts. of lead per fathom, and very easy ground for progress. No. 2 vein, sinking below the 30, the lode is worth 1 ton of blende and 5 cts. of lead per fathom, to the length of winze—9 ft. long. In the 18, driving east, the lode is very much disturbed by a cross course. In the 18 west, in the same level, the lode is 4 ft. wide, composed of beautiful stones of lead, blende, quartz, sulphur of mundic, and gossan—a very promising lode at that shallow point from surface. The stopes working in back of the 30 average about 1 ton of blende and from 4 to 6 cts. of lead per fathom. The stopes in back of the 18 have considerably fallen off in value. We have had a serious breakage at the crusher and jiggling machines, which has considerably made against our sampling.—N.B. While writing the report the 40 end men have brought up some beautiful stones of lead from the lode, and inform me that the lode has very much improved since I came up to-day. The mine throughout is looking very promising. The 30 end looks nice, going late all whole ground, and the 18 end west is a beautiful lode to the shallow depth.

KIT HILL TUNNEL.—H. Bennett, Dec. 27: I cannot report any change since last week; the ground continues favourable for driving, and we are still meeting with small branches of iron.

LADYWELL.—A. Waters, Dec. 27: The lode in the adit south of new shaft has slightly improved for lead since my last report. No change of note in the 18 fm. level. The 12 south shows more lode stuff and better-looking country rock than of late, but at present there is no ore to value. The new shaft above referred to is holed to the high slope above the adit level, and the men are now preparing to widen the workings and make good the shaft through them downwards.

LIVINGSTONE CONSOLS.—Wm. Vivian, Dec. 27: We have commenced to clear up the eastern shaft on the Wheal Kitty lode; this shaft is about 50 fms. deep. We have put down a footway, and put in a horse-whim. I have been told by Dr. Whittleworth it is 35 years since this part of the mine was last worked. The doctor says it is one of the best places he knows of to open a mine. From information given by respectable miners, as soon as this shaft is put right we shall find ground that will let on tribute. I have already let one bargain on tribute—the shaft to three men to stamp out 14s. in 1/2 the men to pay all costs. I think we shall open up a piling mead with a small outlay.

MARKE VALLEY.—Wm. George Stanhope, Dec. 27: We are urging on the different tutwork bargains reported last week, but notice very little alteration in their respective values. Tribute pitches also without change.

MELLANEAR COPPER.—J. Gillett, Dec. 27: The lode in the 50, west of the skip-shaft, is 2 ft. wide, and worth 2 tons of copper per fathom. The rise in the back of this level is up about 10 fathoms, and we have commenced a 40 fm. level, west of the rise, on a lode with 2 tons of ore per fathom. We have communicated the rise in the back of the 60, east of No. 3 rise, to the 50, and have put the men that were rising to take down the south part of the lode that was left standing in the side of the 60. The stopes in the back of the 67, east and west of No. 1 rise, is worth 4½ tons of ore per fathom. The stopes in the bottom of this level, west of the cross course, is worth 7 tons of ore per fathom. The stopes in the bottom of the 90, east of Gundry's shaft, is still worth 3½ tons of ore per fathom. There is no change to notice in the value of any of the other bargains.

No. 2 rise, in the back of the 60, is worth 5 tons of ore per fathom; and the 50, east of No. 1 rise, is also worth 5 tons of ore per fathom.

NEW TULLWID.—Dec. 26: The lode in t. 20, west of cross-cut, continues about 3 ft. wide, mixed with several ribs of "spat," "ay-slate," and a little blende; there is also a little ore in it in spots. The stuff as yet is not worth keeping for dressing. There is more water coming in now than there has been, and this is a sign that it is going to make ore again. I hope you will have a better report, and that before long.

NORTH CORNWALL.—Thomas Doldge, Dec. 26: I am pleased to inform you that we have cut the lode in the south adit; we have only just now touched it in the bottom of the cross-cut, and this is a very small hole, but from it splendid stones of quartz were broken and fluor spar, which is locally called—can—a large stream of water is issuing from this hole.—North Adit: Here the lode continues its fine appearance, is 3 ft. wide, and in the last taking down of the lode, which is only a day or two ago, it produced splendid stones of lead; the branch of mundic in connection with this lode is much the same as when last reported. I may further remind you that as we advance with this end we are nearing the point where the new lode cut in taking out foundation for smith's shop in the pit will form a junction with the lode we are now driving upon; at this point I fully expect something good. As the lode in the south adit is very wet I expect a very large lode; it will take some time to get through it, but I am pleased to find the lode where I thought it was, and I am confidently expect to open up a very fine lode.

NORTH LAXEY.—John Sowden, Dec. 24: There is not any change in the 146 ends since last reported on. The stopes in the sole of the 60 is worth 1 ton of lead per fathom.

PANDORA.—H. Nottingham, Dec. 26: We have done nothing in the bottom driving the last fortnight, being engaged with the new pitwork. We started the new plunger to work on Saturday last, and everything is working well. We shall proceed with the fixing of 9 in. lift to bottom as soon as we get the water low enough.—23 fm. level, New Lode: No. 1 stop over this level is worth 10 cts. of lead and 15 cts. of blende to a fathom. No. 2, south of ditto, is worth 15 cts. lead and 20 cts. blende to a fathom. We are roofing here, with the view of getting a communication with the 13 as soon as possible. The best lead is standing upon south end of the stopes. The intermediate level driving south from junction between the 23 and 13, on Goddard's lode, is looking very promising, the lode being more open, and yielding nice balls of lead. The sound of working is heard very plain between this and the 33 cross-cut, which indicates open ground, and seeing that we have done nothing on Goddard's lode between the cross-cuts at shaft and the junction, there may be a good course of ore here waiting to be opened up. This will receive due attention. The 13 driving south, on new lode, is worth 8 cts. of lead and 15 cts. of blende to a fathom.—Goddard's Lode: The 23, driving south, is poor lead, with a slight mixture of blende. The lode has reversed its underlie here in the last few feet of driving. I think it is very probable the underlie from this northward will be west instead of east as hitherto. The No. 3 stop over this level is worth 8 cts. of lead and 3 cts. of blende to a fathom. The same may be said of the stop working between the 13 and 6 fm. levels. The 13, driving south, is without change calling for remark, the lode being a mixture of blende and carbonate of lime and traces of lead occasionally. Dressing is now progressing satisfactorily, the crushing and jiggling machinery being in thorough good order and working well. Samples of 40 tons of blende were sent out on Monday.

PENHALLS.—S. Bennetts, P. Vian, Dec. 22: In the 70 east end the lode has come in contact with another of those faults, and as yet is not found on the other side. The 60 east end contains some good stones of tin, and worth about 6d. per fathom. The 55 east is worth 15d. per fathom, and the same level west 7d. per fathom, and on another section of the lode 8d. per fathom. The 48 west is worth 2d. per fathom, and the 45 west is just now poor.

PENNANT.—Dec. 27: I am glad to say that the lode in the shaft is gradually improving, and I think we cannot be far from the intersection of a great body of ore. Our various stopes are looking well, and important progress is being made in the dressing floor.

PLYNLMON.—John Garland, Dec. 27: In the 35, east of new shaft, the lode continues small and poor. In the same level, west from Jones's winze, the ground is very hard, and the lode is also small and poor; we are daily expecting to hole these ends. In the 35, east of Jones's winze, the lode is large and kindly, composed of calc-spar, blende, mundic, and strong spots of lead, but not in sufficient quantity to value. The 36, west of Herbert's winze, produces occasional stones of lead ore only. In the same level, east of winze, the lode which has during the past few days been comparatively poor, is again improving, and now produces about 15 cts. of lead ore per fathom. The stop over the 24, east of new winze, continues to yield from 25 to 30 cts. of lead ore per fathom. The lode in the 24 east produces some good stones of lead towards the bottom of the end. I am sorry to say that drawing and dressing are being retarded by heavy snow, but we are doing a little in getting in crop ore.

PRINCE OF WALES.—J. Andrews, Dec. 26: The lode in the shallow end, west of Viger's shaft, is 2 ft. wide, composed principally of quartz, capel, and arsenical mundic, with occasional good stones of silver ore. We are making fair progress in clearing up Viger's shaft below the shallow adit level.

ROMAN GRAVELS.—Arthur Waters, Dec. 27: The 50, south of new engine-shaft, is twinned up for the present, but there is a very wide lode in front of us here, hence the falling off in yield is only temporary. The stopes in the back of the 65 (four of them south of the 50) are yielding ore in profitable quantities, and the lode maintains its width and productiveness at the highest point stopped above the level, and 20 to 25 fms. south of the 40 and 50 ends. The 65 end is about 30 fms. in advance of either of the above ends, the lode being fully 12 ft. wide, the hanging-wall part being worth 3 tons per fathom. We are leaving good ore stuff on the foot-wall to be shot down in due course. The value of the lode in actual sight is 4½ tons per fathom. The 80, south of new shaft, is going forward in a fine lode, and worth 3 tons per fathom. This end is now to within about 6 fms. of being under Mathew's winze below the 65, which is down over 7 fms., but was suspended owing to the water. When the piece of ground is opened a rich section will be available for stopes. The 65, south of shaft, is going forward in a wide, nearly perpendicular lode, but the end is not yet quite far enough to catch the dip of the rich run of ore seen along the 80, but we are expecting an improvement here soon. No change to notice in the other points in the mine since my last report on them. The steam pipes are now all in place, and I expect to get things in readiness at surface and underground for trying the new engine the week after next at the farthest. The weather is rather severe, hard frost and the ground covered with snow; but heating hot water over and through the dressing machinery no delay has yet taken place. The sale of ore on this date (180 tons of lead and 20 tons of blende) realised 2282.

ST. PATRICK.—Wm. Francis, Dec. 26: The sinking under the 120 yard cross-cut on the cross course still looks congenial for ore, and I am expecting to get down to the bed of shale in a few days. The chert driving in the 60 yard cross-

cut also looks well and promising for a main lode. There cannot be a reasonable doubt of a little further progress bringing us into a valuable discovery of lead ore, and that the bearing lodes which have been worked westward will concentrate into increased richness in the measure we are now in.

SOUTH DARREN.—H. James, A. Gundry, Dec. 27: We have commenced forking the water from the winze carried down to the 100, and as soon as it is forked we shall commence driving east and west from same. The shaftmen are cutting out ground in the 90 fm. lode, in order to make room to carry down the shaft. This will be done as quickly as possible, and sinking carried on. The two stopes in this level are looking well. The eastern one has improved, now worth 25d. per fathom; the one west of winze worth 24d. per fathom. The 80 end is improving in appearance as it advances, showing a little lead, but not sufficient to value. The stopes in this level is just the same as when last reported on. The stopes to the east of this has improved a little, worth 10d. per fathom. In the winze being sunk in advance of the 80 and we have cut a small branch of lead to-day, and we shall be able to give you further particulars about it in a day or two. All the machinery is working well.

SOUTH ROMAN GRAVELS.—J. W. Powning, Dec. 27: We have cut through the main lode in the 45 cross-cut south, which is full 6 ft. wide, composed chiefly of carbonate of lime. I have not seen any lead or blende, the lode being strong and poor; I thought it advisable not to do any more at this point, and so save cost. I see no change for the better in the 45, east of the shaft; the cavity in the roof of the level gets wider as we advance, and is now 8 ft. wide in the forebreast. The water in the mine has greatly increased of late, consequently the consumption of coal is greater.

TEESIDE.—T. Watson, Dec. 21: Rise in New Vein, Hopkine's Level: The men have been engaged part of this week in timbering the rise; they have reached the Hazel Sill to-day, with a strong vein going into it at the north cheek, but they still have a good deal of vein left in the Plate, laying next the Sun side of the rise; the vein is spread over a width of 6 ft.; it will take another fathom to rise to prove the vein in the hazel; the vein as it has been working this week is worth 6 cts. of lead ore to the fathom.—Surface Work: If the weather keeps fine and open we will have 15 bings of house ore, and about the same quantity of sludge ore, laid down by the 26th inst. We have kept the two kinds of ore separate.

TOLGUS CONSOLS.—W. C. Vivian, Dec. 27: The progress in the 40 cross-cut has not been much this week, owing to the Christmas holidays; but work is now resumed, and no further hindrance will, I trust, occur for some time. The stopes working in back of the 30 average about 1 ton of blende and from 4 to 6 cts. of lead per fathom. The stopes in back of the 18 have considerably fallen off in value. We have had a serious breakage at the crusher and jiggling machines, which has considerably made against our sampling.—N.B. While writing the report the 40 end men have brought up some beautiful stones of lead from the lode, and inform me that the lode has very much improved since I came up to-day. The mine throughout is looking very promising. The 30 end looks nice, going late all whole ground, and the 18 end west is a beautiful lode to the shallow depth.

TREBEGH CONSOLS.—J. Gifford, Dec. 24: In the 45 east the lode is still 1½ ft. wide, and producing some good work for lead; a very promising end, but not rich enough to set a value upon it. In the 45 west the lode is 2 ft. wide, composed of good quartz and sulphur mundic and blende.

TRELEIGH WOOD.—W. Goldsworth, Dec. 27: There is no change to notice in the bargains since my last report. The machinery and pitwork are in good order, but the water is much increased by the late rains.

TYN-Y-FRON.—A. Francis, Dec. 26: The south lode, west of cross-cut in the deep adit, is worth 2 tons of blende per fathom, and some good copper ore; it is, however, so near the surface that we thought it desirable to suspend it and wait for deeper levels. The men are now opening out on the lead discovered 60 fathoms east of this, also on the south lode, which is from 4 to 5 fathoms south of the north or main lode at this place; at least, we have this distance to reach the south wall of the south lode, which is 12 ft. wide. We anticipate breaking down some rich lead ore from this bargain in the end and the ensuing week.

VAUGHAN.—Dec. 26: There is no change worth of remark at any of the underground points since our last report. The 30 east is still in unproductive ground, and cannot expect an improvement till we are through the cross channel or fluor spar, when we hope the lode will become productive. The weather at present much impedes our progress in dressing, having frost and snow.

WEST GODOLPHIN.—J. Pope, Dec. 26: There is no change in the mine to notice since last report. Christmas holidays will, however, make against our time this time.

WEST PATELEY BRIDGE.—D. Williams, Dec. 27: I have written to Messrs. Roey and Co. to forward the engine at once. We have heavy frost and snow up here just now, which prevent us getting out on very slow indeed with our surface works. The feeder referred to in my last in the 20 east is opening out well westward, being fully 18 in. wide, producing fine branches of lead ore.

WEST TANKERVILLE.—A. Waters, Dec. 27: The lode in the 86, south of shaft, is still of great width, and is the best looking thing ever seen in the mine so near the shaft; the part of the lode being carried in the drivage is worth 2 tons of lead ore per fathom. The winze sinking below the 75, upon the above-named end, is opening up a lode worth 2 tons per fathom: this will be holed to the 86 by the end of next month. Other points without change of note since last reported on. I shall have the gear for pumping out of Boundary shaft ready some time next week.

WEST WHEAL TOLGUS.—Dec. 23: We have driven 6 ft. in the west end of the 135 since the meeting on Wednesday, which has yielded 8 tons of ore. The end is now 2 fms. west from the cross-course, and looking splendid. The lode is 7 ft. wide, and yielding 8 tons of ore per fathom, ground moderate for driving. In the winze under the 135 the lode is still up to the mark, yielding 14 tons of ore per fathom; fine lode, and continues dry. In the 145 end west the lode is changing for the better. Next week will be broken by the Christmas holidays, but this will not interfere with the January sampling.

WHEAL CREBOR.—J. Andrews, Dec. 23: The lode in the 120 east is opening out very encouraging, which is now from 5 to 6 ft. wide, and worth 20d. per fm. All other points continue of the same value as when last reported on.

WHEAL KITTY (St. Agnes).—S. Davy, R. Harris, Dec. 22: New Shaft—Pryor's Lode: The lode in the 154, driving west of the shaft, is producing a little tin, but at present hard and spare for driving. The lode in the 142, driving west of shaft, is 3 ft. wide, and becoming more settled as it advances from the cross-course, now worth for tin 8d. per fathom. The lode in the 142, driving east of shaft, is small and poor. The lode in the 94, driving west of the shaft, is improved in appearance and value, now 2½ ft. wide, and worth for tin 9d. per fm. The lode in the 65, driving west of the shaft, is 3 ft. wide, but from the effects of a small crossing is not so good as when last reported, now worth for tin 9d. per fathom.—Old Lode: The lode in the 100, driving west of the engine-shaft, is 2 ft. wide, and worth for tin 6d. per fathom. The lode in the 90, east of engine-shaft, is still unproductive.

WHEAL NEWTON.—H. Bennett, Dec. 27: There is no alteration in either of our ends, and the stopes continue to yield their usual quantities of good silver ore.

WHEAL UNY.—W. Rich, M. Rogers, J. Rich, Dec. 22: Hind's shaft, sinking below the 160, is worth 15d. per fathom. We shall resume driving the 160, east of Gouding's, next week. The 160 end west is worth 8d. per fathom. The 150 end west is worth 30d. per fathom: this is important, as it appears to be a new shoot of tin, and is further west than the level above or below.

WHEAL CHERBOR.—J. Andrews, Dec. 23: The lode in the 120 east is opening out very encouraging, which is now from 5 to 6 ft. wide, and worth 20d. per fm. All other points continue of the same value as when last reported on.

WHEAL KITTY (St. Agnes).—S. Davy, R. Harris, Dec. 22: New Shaft—Pryor's Lode: The lode in the 154, driving west of the shaft, is producing a little tin, but at present hard and spare for driving. The lode in the 142, driving west of shaft, is 3 ft. wide, and becoming more settled as it advances from the cross-course, now worth for tin 8d. per fathom. The lode in the 142, driving east of shaft, is small and poor. The lode in the 94, driving west of the shaft, is improved in appearance and value, now 2½ ft. wide, and worth for tin 9d. per fm. The lode in the 65, driving west of the shaft, is 3 ft. wide, but from the effects of a small crossing is not so good as when last reported, now worth for tin 9d. per fathom.—Old Lode: The lode in the 100, driving west of the engine-shaft, is 2 ft. wide, and worth for tin 6d. per fathom. The lode in the 90, east of engine-shaft, is still unproductive.

WHEAL NEWTON.—H. Bennett, Dec. 27: There is no alteration in either of our ends, and the stopes continue to yield their usual quantities of good silver ore.

WHEAL UNY.—W. Rich, M. Rogers, J. Rich, Dec. 22: Hind's shaft, sinking below the 160, is worth 15d. per fathom. We shall resume driving the 160, east of Gouding's, next week. The 160 end west is worth 8d. per fathom. The 150 end west is worth 30d. per fathom: this is important, as it appears to be a new shoot of tin, and is further west than the level above or below.

WHEAL CHERBOR.—J. Andrews, Dec. 23: The lode in the 120 east is opening out very encouraging, which is now from 5 to 6 ft. wide, and worth 20d. per fm. All other points continue of the same value as when last reported on.

WHEAL KITTY (St. Agnes).—S. Davy, R. Harris, Dec. 22: New Shaft—Pryor's Lode: The lode in the 154, driving west of the shaft, is producing a little tin, but at present hard and spare for driving. The lode in the 142

causing it to fall in a melted state in small regulated streams or drops upon a rapidly revolving cylinder kept cool by water circulating within it through hollow journals. The metallic lead so divided he spreads upon racks one above another, over and through which by an intermittent movement a solution of acetate of lead in water is caused to flow, white-lead being precipitated from such solution by the action of carbonic acid gas. He separates the white-lead from the solution by subsidence, or by passing it through a filter press, or by forcing it under and through a cloth supported by a grooved and perforated false bottom placed in a vat or vessel, and he washes the white-lead by keeping it agitated, and forcing water through it while under a similar false bottom placed in a separate vessel. He further produces white-lead by passing a current of carbonic acid into water with or without the addition of acetic acid or acetate of lead in solution, and containing finely divided oxide of lead, produced by the abrasion of metallic lead exposed alternately to the action of water or the lead solution, and to the atmosphere.

* * With this week's Journal a SUPPLEMENTAL SHEET is given, which contains—Original Correspondence; The Great Silver Discoveries in Australia (H. Sewell); Tasmanian Tin Fields—No. III. (J. Mufford); Flagstaff Mining Company (M. C. Vincent); Condes Company of Chile; Galway's Coal Dust Theory; Safety Apparatus for Mine Lifts; the Buying and Selling of Mines; Electric Lighting of Mines—No. V (A. Vassard); the Nickel Trade (J. W. Williamson); Nickel Ore; Nickel and Nickel Ores; the Trials of Rock-Drills (Le Gros, Mayne, Leaver, and Co.); the Reported Discovery of Ore in Rhayader; "The Great Discovery of Lead near Rhayader," and other matters; State Quarries in Cardiganshire; Cardiganshire Mines—Cwm Erw, &c. (A. Frances); Great West Van Mining Company (W. Ward); the White Cliff Lead Mining Company, Llanrwst (H. C. Parkes); Old Treborth Mine; Vale of Conway Lead Mines; the Cambrian Mining Company (G. H. Keene); "Circular Mining"; West Craven Moor Mine (Gregory, Whitaker, and Co.); Registration of New Companies—the Scotch Mining Share Market—Improved Rock-Drilling Machinery—the Globe Rock-Drill (Illustrated)—the Darlington Screw Rock-Boring Machine—Nevel Pump Valve, &c.

TO THE METAL TRADE.

FOR COPPER, TIN, LEAD, &c., apply to—
MESSRS. PELLY, BOYLE, AND CO.,
SWORN METAL BROKERS,
ALLHALLOWS CHAMBERS, LOMBARD STREET, LONDON.
(ESTABLISHED 1849.)

The Mining Market: Prices of Metals, Ores, &c.

METAL MARKET—LONDON, DEC. 28, 1877.

IRON.	£ s. d.	£ s. d.	£ s. d.
Pig, g.m., f.o.b., Clyde.	2 11 6		
" Scotch, all No. 1	2 13 0	3 0	10 0
Bars, Welsh, f.o.b. Wales	5 0	5 0	10 0
" " in London	5 15 0	5 0	—
" " Stafford,	7 0	0 8	0 0
" " in Tyne or Tees	5 10 0	5 0	10 0
" " Swedish, London	8 0	5 0	12 0
Rails, Welsh, at works.	5 0	0 5	2 0
Sheets, Staff., in London	8 15 0	9 0	0 0
Plates, ship., in London	7 0	0 7	5 0
Hoops, Staff.	7 15 0	8 0	0 0
Nail rods, Staff., in Lon.	7 0	0 7	5 0
STEEL.			
English, spring	14 0	0 19	0 0
" cast	35 0	0 45	0 0
Swedish, keg.	16 0	0	—
" " ham.	17 0	0	—
LEAD.			
English, pig, common	18 0	0 19	5 0
" " L.B.	19 0	5 0	10 0
" " W.B.	20 0	0	—
" sheet and bar	20 5 0	—	—
" pipe	20 10 0	—	—
" red	22 0	5 0	22 10 0
" white	25 0	5 0	28 0 0
" patent shot	24 0	0	—
Spanish	15 0	10 0	18 15 0
NICKEL.			
Metal, per cwt	23 0	0 24	0 0
Ore, 10 per cent. per ton	38 0	0 40	0 0
QUICKSILVER.			
Flasks of 75 lbs., ware.	7 5 0	—	—
SPELTER.			
Silesian or Rhinish	19 0	0 19	5 0
English, Swansons	21 0	0 12	0 0
Sheet zinc	22 10 0	24 0	0 0

* At the works, 1s. to 1s. 6d. per box less for ordinary; 10s. per ton less for Canada; 1X. per box more than 10c. quoted above, and add 6s. for each X. Tin-plates 2s. per box below tin-plates of similar brands.

REMARKS.—The Christmas festivities are so generally appreciated in dear Old England that not even the usually grave and sober-minded business man can remain wholly insensible to them, and there is, perhaps, more life and activity displayed during Christmas than at any other part of the year, but the excitement and eagerness to make purchases and investments unluckily do not apply to metals, but is almost exclusively absorbed by the provision and fruit markets and fancy articles emporiums; however, we will not protest as we do not so much object to the temporary cessation of business, considering the pleasures and enjoyments are universal, and extend throughout Christendom. The price of copper and tin, important as it may be in a general way, does not appear to be considered in comparison with what will gratify and satisfy the palate and appetite, and the British public are so full of complimentary expressions, and so ready to bestow some substantial recognition of favour upon the deserving, the obliging, and the agreeable members of society, that little else is thought of. It is our festive season, when all is mirth and gaiety, and when happy and joyous scenes are prepared for the entertainment of all ages and all classes, and all are welcome who have the good sense and kind feeling to join in them. Hard and impenetrable as the man of metal may often be found, yet his character is softened under the genial influence of a cheerful family Christmas party, and the enlivening and elevating tendency of the convivialities render him perfectly indifferent to the downward tendency of markets. If copper and tin are not quite so buoyant just now as he would, perhaps, like them to be there is no doubt in his pure imagination that they will come right in the end, and let us hope that such pleasing anticipations may not be disappointed, but that realisations may exceed the most sanguine expectations. As we cannot say much in praise of the old year we refrain from speaking ill of the dying, and will merely remark that there is room for improvement in the ensuing one, and we most sincerely and heartily wish all connected with the metal trade uninterrupted and unparalleled prosperity during the year 1878.

QUICKSILVER.—The past having been a holiday week there has naturally been but a small business transacted, but there is a firm feeling, with indications of revival of demand; price 7s. 5d. The California market continues its upward tendency, and the price at San Francisco is now firm at 47s. to 48 cents. The receipts for the month of November were only 4825 flasks, against 6951 flasks in 1876—being, indeed, smaller than in any month since April, 1876. During the week ending Dec. 6, 1504 flasks were received, and 400 flasks shipped.

COPPER: Quiet, but steady.—TIN: Moderately steady.—IRON: Dull.—SPELTER: Unaltered.—LEAD: Unchanged.—TIN-PLATES: As before.

THE IRON TRADE.—(Griffith's Weekly Report.)—Friday evening. The Glasgow market for Scotch pig-iron has been quiet during the week. The price of G.M.B. warrants in Glasgow at the close of this afternoon's market was 5ls. 6d., about 1s. 2d. per ton below the closing quotation last Friday. We quote makers' No. 1 iron—Gartsherrie, 60s.; Coltness, 65s.; Calder, 68s. 6d.; Langloan, 62s. 6d.; Summerlee, 59s.; Monkland, 53s. 6d., f.o.b. Glasgow; Glengarnock, 59s.; Eglinton, 54s., f.o.b. Ardrosson; Shotts, 61s., f.o.b. Leith; Kennel, 64s., f.o.b. Bo'ness. The Birmingham Quarter-day is fixed for the 10th prox., and will be held in the Exchange of that town. There is nothing special to notice on our market this week in iron. The Bank holiday on Wednesday (being Boxing day) closed all business, and as all parties are engaged in Christmas festivities, we have no business to report of the least importance on our Exchange this week. The same cause has kept the works idle in iron making centres, and on this account we have but little to say in regard to the trade in manufacturing districts. The great Shropshire and Swan Garden Works of G. B. Thorneycroft and Co. were closed last Saturday, never again

to be started by this eminent old firm. It is reported that the works are sold; however, up to the present moment nothing is definitely settled or signed in regard to this important transaction. Possibly the contract for sale may be signed tomorrow (Saturday).

Business, with the exception of settling the fortnightly account, has been almost at a standstill this week, and in the MINING SHARE MARKET there is nothing particular to report upon either in the way of changes or improvements, or in our quotations, which for the most part are merely nominal, and will probably remain so till the commencement of the new year, when we trust that a more active business will commence, and a prosperous time set in for "one and all."

TIN MINES continue flat, with scarcely any business doing, either for speculation or investment. Wheal Basset, 10 to 12; at the meeting the accounts showed a loss of 696*l.* on the quarter, and a debit balance of 7370*l.* A call of 2*s.* per share was made. The tin sold, 59 tons, realised 2450*l.*; copper, 48*s.* Costa charged to November. The agent's report states that in another two months he hopes to reach the great vein of tin ground gone down below the 115 fm. level, where he has always anticipated the most favourable results. It was announced that the claims on audit account have been settled, South Frances and West Basset each agreeing to pay Wheal Basset 100*l.* The settlement was approved of.

Carn Brea, 42*s.* to 45; Cook's Kitchen, 2 to 2*s.*; Dolcoath, 33 to 35; Penstruthal, 4*s.* to 6*s.*; South Condurrow, 9 to 9*s.*; South Frances, 2*s.* to 3*s.*; the prospects here are said to be improving. Tincroft, 12 to 13; West Godolphin, 1*s.* to 2*s.*; Wheal Agar, 4 to 4*s.*; Wheal Grenville, 3 to 3*s.*; call of 8*s.* paid. Wheal Kitty, St. Agnes, 2*s.* to 2*s.*; Wheal Peevor, 6*s.* to 6*s.*; Wheal Uny, 1*s.* to 1*s.*; South Crofty, 10 to 15; Livingstone Consols, 15*s.* to 20*s.*

COPPER MINES.—One or two dividends have been declared during the week, but there is very little doing in shares. South Caradon, 85 to 90 ex div.; at the meeting a dividend of 2*s.* per share was declared. The accounts showed a profit of 300*l.*, and 65*l.* recovered from a dishonoured acceptance of the Copper Miners' Company. The agents report that the mine looks as well as it has done for years past. West Tolgus, 75 to 77*s.*; at the meeting here a dividend of 1*s.* 10*s.* per share was declared. The accounts showed a profit of 1129*l.*, and a balance carried forward of 1442*l.* The copper ore sold and credited realised 4467*l.* The returns made for the next account are 354*l.* The mine is reported as looking well, and in the winze sinking under the 135 the lode is worth 12 tons of copper ore per fathom. The new discovery west of cross-course is worth 6 tons. Devon Great Consols, 3 to 3*s.*; Wheal Crebor, 1*s.* to 1*s.*; the lode in the 120 east has improved to 20*s.* per fathom. West Seton, 14 to 15; Parys Mountain, 9*s.* to 10*s.*; Morfa Du, 7*s.* 6*d.* to 10*s.*; Prince of Wales, 3*s.* to 4*s.*; Hingston Down, 3*s.* to 6*s.*

LEAD MINES have been dealt in to a moderate extent, and prices remain about the same. Roman Gravels, 7*s.* to 7*s.*; the sale of lead ore, 180 tons, with 20 tons of blonde, realised 228*l.* Tankerville has been rather more enquired for at a slight advance, and leave off 4 to 4*s.* Cargoll, 2*s.* to 3*s.*; at the meeting there was a balance against the company of 558*l.*, and a call of 5*s.* per share made. The lead sold realised 180*l.*, and the loss on the quarter was nearly 100*l.* Glenroy, 16*s.* to 20*s.*; a telegram states that the lode in the shaft is 9 ft. wide, with more blonde in it. In the 25 end there is 1 ft. of rich blonde. Van, 29 to 31; East Van, 3*s.* to 4*s.*; Great Laxey, 21*s.* to 22*s.*; North Laxey, 6*s.* to 8*s.*; a meeting has been called for Jan. 10, to take the local management into consideration. The stope in the back of the 60 is worth 1 ton of lead per fathom. D'Eresby Mountain, 50 to 60; Leadhills, 4*s.* to 4*s.*; Llanrwst, 1*s.* to 2*s.*; Herdfoot shares have further advanced to 10*s.* 12*s.*

Pateley Bridge, 3*s.* to 3*s.*; West Pateley, 2*s.* to 2*s.*; Rookhope (Lead), 19*s.* to 21*s.*; West Tankerville, 12*s.* 6*d.* to 17*s.* 6*d.*; West Chiverton, 13*s.* to 14*s.*; Temple, 2*s.* to 2*s.*; Wye Valley, 2*s.* to 2*s.*; West Wye Valley, 3*s.* to 4*s.*; Grogwinion, 4*s.* to 4*s.*; St. Harmon, 1*s.* to 2*s.*; Van, 30 to 32; we understand the dividend next week will be 12*s.* per share, and about 100*l.* added to the reserve fund. North Cornwall, 4*s.* to 4*s.*; Leadhills, 4*s.* to 4*s.*; Llanrwst, 1*s.* to 2*s.*; Headhills, 4*s.* to 4*s.*; Hingston Down, 3*s.* to 6*s.*

PHOSPHOR BRONZE.

	£ 112	0	0
Bearing metal	£ 112	0	0
Other alloys	£ 120	0	0

BRASS.

	8 <i>s.</i> 4 <i>d.</i>	—
Wire	8 <i>s.</i> 4 <i>d.</i>	—
Tubes	10 <i>s.</i>	—
Sheets	8 <i>s.</i> 4 <i>d.</i>	—
Yel. met. sheath. & sheets	6 <i>s.</i> 7 <i>d.</i>	—
Nails composition	8 <i>s.</i> 4 <i>d.</i>	—

TIN-PLATE.* per box.

	1	0	0	1	1
Charcoal, 1st quality	1	0	0	1	1
" 2nd quality	0	19	6	1	0
Coke, 1st quality	0	18	0	—	—
" 2nd quality	0	17	6	—	—
Black	0	16	0	10	0
" ton	15	0	0	10	0
Canada, Staff. or Gla.	11	10	0	12	0
" Liverpool	21	0	0	10	0
Black Targers, 450 of	30	0	0	—	—
" 14 x 10	—	—	—	—	—

The Market for Mine Shares on the Stock Exchange has been almost entirely without business, as most of the dealers had commenced their holidays on Monday, whilst Tuesday and Wednesday were closed days, and Thursday and Friday were devoted to exchanging healths and good wishes, accompanied by the hope that the coming year will be a more prosperous one both for capitalists and dealers. During the year just closing the frauds habitually practised by promoters and others connected with the floating of companies and sale of property to them have been so thoroughly exposed that it is unlikely that even those who are still at large (for several are already receiving gratuitous board and lodging) will attempt a repetition of their malpractices. All the recent legal decisions seem to show that the Courts are determined to encourage legitimate enterprise by protecting those who provide the funds for carrying it on, and that the law, as it at present stands, is strong enough to enable judges and juries to do so in now become question. It would be for the good of all if every capitalist who now holds shares in a public company which has failed to turn out as remunerative as promised would aid in securing an investigation into the process by which the company was floated, the proceedings of the promoters, and the amounts which have been appropriated by those who have been concerned in the transfer of the property from the original vendor to the company. There are many solicitors of acknowledged position who would undertake the professional conduct of the investigation for a percentage of the amount recovered from the intermediate vendors and promoters, and the amount that could be so recovered would in many cases furnish such a working capital fund as would permit of the properties being raised from their present state of bankrupt inactivity to a position of permanent prosperity. The suggestion would be equally applicable to companies working home and foreign mines, and as several of those most readily dealt in at the present time are those in connection with which investigation is most needed there would be the less trouble in carrying it out.

In his general summary for the year our Cornish Correspondent gives some interesting figures with regard to the dividends paid by the Cornish and Devons mines as compared with those of 1876. It appears that in 1876 there are 13 mines paying dividends, and the amount distributed was 40,871*l.* During the year just closing there were 15 mines in the Dividend List, and the nominal amount distributed as dividends has been 68,004*l.*, but he remarks that there is uncertainty as to whether in the cases of Holmbush and Wheal Newton the amounts have been paid. The fact appears to be that in these mines the dividends were declared at so much per share at time when comparatively few shares had been issued, and that such dividends were paid upon those shares only which were issued at the date of declaration. If this really be the principle upon which the dividends have been announced it is, to say the least, very misleading to subsequent investors, and if it be not the executive should lose no time in putting themselves right with the public, the very common enquiry being as to what ores have been produced and what market they have been sold in, as no figures can be found in any of the public records to account for any such profits as those mentioned. Those connected with the management of the companies will, naturally, we believe, be as glad as any one of our readers to have an opportunity of removing by the publication of the fullest details, the probably erroneous impression which exists. It is not always well, however, to suggest deductions in respect of all dividends which are declared upon incomprehensible grounds, or out of profits which the outsiders cannot understand to have been made, or Wheal Prussia and Penrhyn-dre, and, perhaps, one or two others, might have to be ranked with the two already referred to. It is to be hoped, however, that in all these cases the matters are capable of explanation, and that no time will be lost

by those concerned in removing all possible misapprehensions. But even expunging the whole 26,125*l.* standing against these four mines, the distributed dividend fund for 1877 still stands at 41,879*l.* There is a decidedly better prospect of the coming year proving a more prosperous one both for capitalists and working miners.

St. John del Rey, 300 to 310 ex div.; the telegram received on Thursday, dated Rio de Janeiro, Dec. 24, states that the profit for November was 870*l.* This was obtained from a produce of 42,500 aggregate cost of 776*l.* Don Pedro North del Rey, 4*s.* to 4*s.*; the produce cleaned up for the first division of December was 1650*l.* The 60-ft. iron wheel for driving the permanent pumping machinery has been set to work for a trial and to adjust balance, and so on.

Richmond 8*s.* to 8*s.*; the usual weekly telegram from the mines states that the week's run was \$80,000, from 1070 tons of ore, with 32 furnaces. The week's produce of the refinery was \$47,000. The agent's report is to Dec. 5. The 400 stope is not looking so well, but the 500 cross-cut is improved in appearance; for the last 20 ft. it has been in ore matter on a well-defined fissure, and he is expecting

as the cyanide of sodium, may be employed; or compounds which in contact with melted copper yield a fusible cyanide may be employed, such, for example, as dried ferro-prussiate of potassium.

PRODUCING IRON AND STEEL FROM OXIDE OF IRON AND ORES.

The process of ore dressing or separation by mechanical means of the worthless impurities from the valuable ore before it is subjected to chemical treatment in the furnace is very advantageous, for the reason that the cost and loss of material in dressing is less than the cost or loss or waste of material in smelting. Iron ores are usually treated in the furnace without any previous attempt to remove the associated impurities by mechanical means, and in this operation chemical complications ensue, the solution of which has occupied and continues to occupy the attention of many eminent men, whose scientific investigations relating to this subject fill many volumes. To remove the silica from the ore, large quantities of limestone and coal are consumed in furnaces of large dimensions with the result of producing proportionate quantities of worthless slag, while the iron produced remains contaminated by impurities which require subsequent further chemical manipulation for their removal.

According to the invention of Mr. B. W. HART, of Garway-road, he proposes to separate by mechanical means impurities associated with oxide of iron or other iron ores. He crushes the ore to the required fineness; he separates the associated minerals by the process analogous to that usually known as jiggling, but in machines wherein air is the medium employed for the separation which takes place according to the respective specific gravities of the minerals associated, the oxide of iron or other ore of iron being by this means obtained in a nearly pure condition. The iron ore so purified is then exposed to the action of heat in a blast-furnace, or in a reverberatory or rotating furnace, or any other suitable furnace, and metallic iron or steel is thereby obtained. By this invention he effects the separation of the ore of iron from the associated mineral impurities, in whole or in part, by mechanical means, before the ore is heated in the furnace—that is to say, by jiggling with air as the separating medium.

NEW ROTARY ENGINE.

An apparatus which the inventor describes as an improved steam-wheel, adapted to take the place of the ordinary steam-engine, and which is at once simple in construction, reliable in operation, and safe in use, has been suggested by Mr. J. C. THOMAS, of Carlinville, U.S. The novelty of the arrangement consists in the combination of moveable pistons, rods, spring boxes, slotted guides, levers, and slides, provided with outwardly projecting pins, with a flanged wheel and grooved case; in the combination of the steam-chest, the segmental packing provided with the projections, the inlet and the outlet port, and the adjustable block with each other, and with the flanged wheel and the case; and in the combination of the crank rock shaft, the extensible connecting-rod, and the grooved wheel with the valve of the steam-chest, and with the shaft that carries the wheel for controlling the movements of said valve from the movements of the wheel. The lower part of the case of the wheel is made rectangular in form, and in bearings in the upper parts of the sides revolve the journals of a shaft, to which shaft is attached a wheel, the face of which has ring flanges formed along its edges, making a wide deep groove or channel upon it. The wheel is made with six or more arms connecting its rim with its hub, and in its face between its flanges, and midway between its arms, are formed deep transverse grooves, in which radial pallets work. To the inner edge of each of the pallets are attached the outer ends of two or more rods, which pass through stuffing boxes attached to the inner side of the rim of the wheel to prevent any steam from passing into the interior of the wheel around the rods.

The inner ends of the rods are attached to the outer sides of boxes, in the open inner sides of which bars are held out by springs placed in the said boxes. The ends of the bars pass through slots in the ends of the boxes, which gives the pallets a little play, while the springs hold them all the time against the packing hereinafter described. The ends of the bars enter guide slots in radial bars, which have their outer ends attached to the rim and their inner ends attached to the hub of the wheel. The ends of the bars also pass through holes in the ends of the long arms of levers which are pivoted to the side edges of the arms which connect the rim with the hub of the wheel. To the ends of the short arms of these levers are pivoted the inner ends of bars which slide in keepers attached to the rim of the wheel, and have outwardly projecting pins formed upon or attached to their outer ends. The pins have friction sleeves or rollers placed upon them to diminish the friction as the said pins move through their guide slots. The pins move through guide slots made in the sides of the case, and which are made with jogs or offsets to protect the pallets, to receive steam, and to draw in said pallets at the exhaust ports.

The steam-chest rests upon the upper edge of the case of the wheel the steam being admitted through a hole in its side, passing to the wheel through an inlet port, and is formed upon or secured to the upper end of packing, which is curved upon the arc of the circumference of the wheel, and has projections upon its upper and lower ends of such a size as to fit into the space between the flanges of the wheel. The inner sides of the projections are inclined or bevelled, and their faces are recessed to receive the brasses, which are held out by springs against the face of the wheel. The ends of the brasses have arms formed upon them projecting back at right angles across the ends of the projections, so as to rest against the inner sides of the flanges of the wheel, against which they are held by springs.

The body of the brasses is made in two parts halved to each other, so that it may be expanded and contracted longitudinally to enable its end arms to adjust themselves to the inner sides of the flanges of the wheel. Upon the inner side of the brasses a plate is placed against which the springs which hold the brasses out rest, to prevent steam from passing through the space between the parts of said brasses when said brasses are extended longitudinally. The packing rests upon and is supported by a block, the forward side of which is concave to receive and fit upon the outer side of the packing. The outer part of this block is made angular to fit into the end of the case, and the block is moved forward and back to adjust it by a screw passing in through the middle part of the end of the case, and is then passed to cause the packing to bear squarely against the face of the wheel by four set screws passing in through the corner parts of the end of the case. The block is held down upon its seat by flanges formed upon the inner and outer ends of its base. One flange enters a keeper attached to the bottom of the case, and the other flange passes out through a hole in the end of the said case. The latter flange is slotted to receive a screw, by which the block is further secured in place. The exhaust port passes through the lower part of the packing, through the lower part of the block, and through the bottom of the case.

The entrance of the steam through the inlet port is regulated by a valve placed in the steam-chest. The valve stem passes out through the wall of the steam-chest, and its outer end is pivoted to the end of an arm rigidly attached to a shaft, which rocks in bearings attached to the end of the case. One end of the shaft projects beyond the side of the case, and to it is attached a crank arm to receive a notch formed upon the lower side of a connecting-rod which slides in guides attached to a bracket attached to the case. To the inner side of the outer part of the rod is attached a pin, which enters a groove in the side of a wheel that is mounted on the shaft that carries the flanged wheel. The said groove is made in the general form of a circle, with as many salient curves as there are pallets to the flange wheel, and in such positions as to operate the valve to admit the steam as each pallet passes the inlet port. The length of the curves regulates the length of time the valve is held open.

The connecting-rod is made in two parts, connected to each other by a long or swivel nut, so that the said rod may be lengthened or shortened to regulate the throw of the inlet valve. To this rod, directly over the notch that receives the pin of the crank, is pivoted a hook to be hooked upon a pin or neck formed upon the end of the crank shaft. The hook is made of such a length that when hooked

upon the shaft the notch of the rod may be raised from the pin of the crank to enable the valve to be operated to start the wheel whatever be its position. A hole is formed in the crank shaft to receive a hand lever for operating the inlet valve by hand in starting the wheel. The upper part of the wheel is covered with a cap or case to keep out dust and dirt.

METALLIC PISTON.—According to the invention of Mr. J. GOODFELLOW, of High Cheshire, he dispenses with the outer rings, and employs two helically cut rings one within the other. The outer surface of the outer ring works in contact with the cylinder in which the piston is fitted to work. One ring is cut with a right-hand spiral cut, and the other ring with a left-hand cut. The spiral cut in each ring does not extend entirely around the said ring. He has obtained good results from a ring cut with a spiral cut extending around about two-thirds of the circumference of the ring, the remaining third or thereabouts being uncut, but he does not confine himself to these proportions. In some cases he makes the rings tapering in cross section; that is to say, he bores the outer ring conically, and turns the inner ring conically to correspond. Although he prefers that the said spiral cut in each ring shall not extend entirely around the ring, he does not intend to confine himself to this particular system of cutting; and if preferred or considered to be more suitable in any case or for any reason, a spiral cut extending more than once around the ring, or even making two turns or more than two turns around the ring, may be employed. Although he referred to the application of the said piston to steam-engines more particularly, he does not confine himself to such application, as pistons constructed in the manner indicated may be used as air pump buckets, and are also applicable for other purpose wherein metallic pistons are required.

LEAD ORES.					
Date.	Mines.	Tons.	Price per ton.	Purchasers.	
Dec. 14	Tan-y-Bwch.	50	£12 1 6	Adam Eyrton.	
15	Llanfrynach	30	11 3 0	Nevill, Druce, and Co.	
27	Roman Gravels	50	12 8 0	ditto	
—	ditto	50	19 5 0	ditto	
—	ditto	50	12 3 0	George Burr.	
—	ditto	30	12 3 0	ditto	

HORNACHOS (Silver-Lead).—This company sold on Dec. 22, to Messrs. Nevill, Druce, and Co., 19 tons 13 cwt. = £58. 18s. 6d.

BLEND E.					
Date.	Mines.	Tons.	Price per ton.	Purchasers.	
Dec. 27	Roman Gravels	20	£3 15 6	Dillwyn and Co.	

BLACK TIN.					
Date.	Mines.	Tons c. q. lb.	Price per ton.	Amount.	Purchasers.
Dec. 27	Wheat Coates	2 4 0 23	£240 12 6	£89 15 10	Daubuz.

COPPER ORES.					
Sampled Dec. 5, and sold at the Royal Hotel, Truro, Dec. 20.					
Mines.	Tons.	Price.	Mines.	Tons.	Price.
Devon Great Consols	106	£1 10 0	Marke Valley	38	£2 18 6
ditto	114	1 10 0	ditto	113	1 13 0
ditto	88	1 10 0	ditto	29	4 7 6
ditto	83	1 16 6	Glasgow Cardon	77	4 3 6
ditto	82	2 0 0	ditto	74	3 7 6
ditto	79	1 15 0	ditto	54	3 1 6
ditto	75	1 9 0	Hington Down	70	1 1 0
ditto	69	4 15 6	ditto	59	2 6 6
ditto	65	1 12 0	ditto	34	2 3 6
ditto	64	4 18 0	ditto	31	1 18 0
ditto	55	4 18 0	Wheat Creb	94	2 11 6
ditto	42	8 6 0	ditto	70	2 11 6
ditto	30	4 19 0	Gawton	75	2 11 6
ditto	22	1 9 6	ditto	59	1 6 6
South Cardon	81	3 0 0	West Maria & Fortescue	62	1 12 0
ditto	78	5 6 0	Bedford United	62	3 8 6
ditto	71	7 10 6	ditto	53	3 11 6
ditto	63	5 5 0	East Cardon	53	4 8 6
ditto	51	11 11 6	Prince of Wales	35	1 12 6
ditto	48	2 16 6	Wheat Friendship	12	2 2 6
Marke Valley	91	2 16 6	ditto	7	2 18 0
ditto	83	2 8 6	Belstone	19	6 8 6
ditto	69	3 8 6	Gonamena	8	3 13 0

TOTAL PRODUCE.					
Devon Great Con.	963	£2443 16 0	West Maria, &c.	122	£283 14 0
South Cardon	470	191 3 6	Bedford United	115	401 6 0
Marke Valley	345	1 16 6	East Cardon	60	265 10 0
Glasgow Cardon	205	737 5 6	Prince of Wales	35	56 17 6
Hington Down	193	341 4 0	Wheat Friendship	19	52 16 0
Wheat Creb	164	42 8 0	Belstone	19	122 1 6
Gawton	133	269 19 6	Gonamena	8	29 4 0
Average standard		£ 96 8 0	Average produce		£ 3 5 6
Quantity of ore		2851	Quantity of fine copper 178 tons 4 cwt.		
Amount of money		£9339 5 0			

LAST SALE.—Average standard £ 85 16 0 | Average produce..... 7 7 6

Standard of corresponding sale last month, £ 87 14 0—Produce, 7 7 6

COMPANIES BY WHOM THE ORES WERE PURCHASED.					
Names.	Tons.				
Vivian and Sons	689 1/2				
Grenfell and Sons	589				
Nevill, Druce, and Co.	469				
Williams, Foster, and Co.	323				
Mason and Elkington	354 1/2				
Charles J. Lambert	426				
Total	2851				

NO SALE on Thursday last, December 27.

Copper ores for sale at Tabb's Hotel, Redruth, on Thursday next—Mines and parcels.—Mellanear 511—West Tolgus 333—West Seton 201—East Pool 147—Levant 134—South Crofty 110—Carn Brea 39—Wheat Conford 38—Killifreath 24—West Roskear 21—Stephens's Ore 12—Wheat Greenvile 10.—Total, 1680 tons.

DYNIN SLATE QUARRIES.

THE TEN PER CENT. INTEREST, due on the Debentures 1st January next, WILL BE PAID ON AND AFTER THAT DAY. Coupons must be lodged with the Secretary, 170, Mansion House Chambers, E.C., or with the Brokers, Messrs. RICHARDSON and Co., 11, Queen Victoria-street, E.C., three clear days.

THE SECOND ISSUE

Notices to Correspondents.

** Much inconvenience having arisen in consequence of several of the Numbers during the past year being out of print, we recommend that the Journal should be sent on receipt; it then forms an accumulating useful work of reference.

GOVERNMENT INSPECTION OF MINES.—In his letter on this subject, published in last week's Journal, "Carbon" intended to have inserted the orthographical exercise set at the examination referred to, but omitted to enclose it; it is, however, of the kind set without any exception where the test is applied—the majority of the words being mis-spelled in order that the candidate's power to write correctly words in ordinary use may be judged of.

COMPRESSED FUEL.—Since the price of coal has declined much less appears to be heard about compressed fuel. May I, therefore, ask what is the average annual consumption in tons, and how much per ton such fuel made from South Yorkshire coal will sell for? Also, what has up to this time been found to be the best cementing material for holding the coal together?—R. T.

PESTLE AND MORTAR MACHINES.—"F. R." (Bala).—The machine referred to was tried to some extent during the Welsh gold mania, some 20 years ago, but never came largely into use. It is, probably, the worst form of machine that could be suggested, since the efficiency of the pestle and mortar depends less on the character of the motion than on the eye of the manipulator, bringing his pestle to bear on constantly varying points where unground particles are noticed. No machine could exercise judgment as to where the next blow or rub should be given.

COLLIERY MANAGERS' EXAMINATIONS.—"K. J. O." (Durham).—Probably the best work published available to the ordinary collier seeking to prepare for a Certificate of Competency is one by Mr. Hyslop. It was published by some bookseller at Wishaw. The simplest means of obtaining it will be to apply to some Edinburgh or Glasgow house. The price was about 1s. Atkinson's book on Ventilation, &c., is out of print, but it was reprinted in America, and an American edition might, therefore, be obtained through Messrs. Tribune, of Lodge-hill.

STONE-BREAKER.—"Inventor" (Bath).—The use of a double hopper, so as to crush on the back and forward stroke, would not be patentable unless there were something special in the mode of doing it. In Gooch's arrangement the moveable jaws were fixed on a block of pear-shaped section, pivoted at the upper and narrower end. An eccentric shaft or cam passed through the lower end, so that at each revolution there was one stroke in each hopper. It worked very smoothly, but it was not stated that any trials had been made for ascertaining whether more work was done for each one-horse power used than with the ordinary single-acting Blake.

PARIS EXHIBITION.—Being very anxious to exhibit at the forthcoming Paris Exhibition a new rock drill, which I have only just patented, and had not thought of in time to apply for space in the ordinary way, I should esteem it a great favour if any reader of the Journal would inform me of a vacant space. I am informed by the authorities that any applicant who has obtained space, and is unable through circumstances which may have since arisen to exhibit, has the privilege of transferring his allotment, and I should be very glad to receive such a transfer for any part of the machinery department.—P. P.

GELATINISED NITROGLYCERINE.—"H. C. B." (Shrewsbury).—This material has been for many months before this scientific world, and interesting descriptions of and papers upon it have appeared in the leading technical journals of France and Germany. Mr. Nobel discovered that by treatment with collodion nitroglycerine can readily be gelatinised into a tough material, much like jujubes. The gelatinised nitroglycerine is nearly pure, for it only contains from 5 to 7 per cent. of foreign material—this latter being collodion which does not lessen the explosive character; indeed, it explodes readily as concussion as ungelatinised nitroglycerine, but it is said that the nitroglycerine does not exude, which is likely as the combination is probably a chemical one. In strength it is about double that of dynamite; and as it is not affected by water it would be useful for blowing up wrecks and such like. Its transportation would require the same precautions and restrictions as nitroglycerine, dynamite, &c., and it is affected by the Explosives Act in the same way.

THE FLAGSTAFF.—Can it be true that Mr. Snell, who a few months ago filed a petition for the liquidation of the Flagstaff Company, has been appointed one of a committee for watching over the interests of the debenture holders?—A DEBENTURE HOLDER.

* * * We are compelled to postpone the reports of several Meetings.

SHARE DEALING.—We never interfere in the sale or purchase of shares; neither do we recommend any particular mine for investment or speculation, or broker through whom business should be transacted. The addresses of most of the latter appear in our advertising columns.

IMPORTANT NOTICE.—REDUCTION OF POSTAGE ON THE "MINING JOURNAL".—In consequence of the new POSTAL CONVENTION, which came into operation on July 1, the postage of the *Mining Journal* to many countries will be reduced to one-fourth. Henceforth the subscription will be 1s. 10s. 4d. per annum (39 frs.), postage included, for the following countries. The amount will, if desired, be collected at the subscriber's residence at the end of each year. The subscription continues until countermanded:—Austria, France, Belgium, Denmark (including Iceland and the Faroe Islands), Egypt, Germany, Gibraltar, Greece, Heligoland, Italy, Luxembourg, Netherlands, Norway, Portugal (including Madeira and the Azores), Roumania, Russia, Serbia, Sweden, Switzerland, United States, Malta, Turkey, Morocco, Tunis, and the Canary Islands. Spain 1s. 19s. (50 frs.).

THE SUPPLEMENTARY SHEET.—We have received occasional complaints, and of late a good many, that the Journal is delivered by country booksellers without the Supplement. Subscribers would oblige us by demanding that the paper should be handed to them complete, as every Journal is accompanied by the Supplement when it leaves our office, and the fault of omission must rest with the country bookseller or their London agent.

Received.—"C. W." (Cerro Preto).—"One Who Knows" (San Francisco).—"T. C." (Woodstock).—"H. D. H." (Paris).—"Shareholder" (Mr. Pearce at Dolcoath).—W. Weston (Colorado).: Next week—"J. P." (Essex).—"Conqueror Reader" (Paris).—"Shareholder" (Llanwrst).—"E. M." (Cardiff).: We could not spare space for such a statement: it would have no interest for our readers.—"G. K." (Rock-Drills).: Next week—"W." (Flagstaff).—"W. E. C."—"Shareholder" (Bristol).

AMERICAN SUBSCRIBERS.—In reply to several enquiries, it may be stated that subscribers in the United States can be supplied with the *Mining Journal* post free, at the price of 25s. gold per annum, payable in advance, by remitting to Mr. D. Van Nostrand, publisher, and importer of scientific books, &c., Murray-street, New York; or, direct to our Office, 26 Fleet-street, E.C.

THE MINING JOURNAL, Railway and Commercial Gazette.

LONDON, DECEMBER 29, 1877.

COAL MINING IN 1877.

During the year now all but numbered with the past the coal trade of the kingdom has been most unsatisfactory, and in many instances disastrous, whilst the close of it leaves every thing in a much worse state than it was at its commencement. The year 1877 has, indeed, not been one of the least eventful in our mining annals, for during it we have had all the characteristics of previous years that in any way relates to the working of collieries, including explosions of gas leading to a serious loss of life, the entire collapse of coal companies, heavy losses on the part of owners, strikes, disputes as to wages, with the addition of a new element—the limitation of production in mines—which is said to be the panacea for securing large profits to masters and high wages to the men. The solution of this most interesting problem, however, is not likely to be attempted just yet, even as an experiment. Still, it is evident that a great many new collieries have been opened out during the last two or three years that were not necessary, and as they are now being developed the question that naturally suggests itself is where markets are to be found for their produce. But this is not a question that can interest the general public further than to assure them that they are likely to have a superabundance of cheap coal as the result of the speculations of capitalists. That this cannot fail to be the case, we have only to look at things as they are at the present time. There are now some thousands of miners entirely idle, many more not working more than three or four days a week, yet more coal is actually being raised than is necessary for manufacturing, household, and every other purpose. In addition to this, new mines are now being sunk in nearly all directions, so that the early prospects of any material improvement in the price of coal that is likely to be permanent are anything but bright. Looking at the trade of the year, we do not think there will be an increase in the output of more than a million of tons over that of 1876, when the production was 133,344,766 tons; if, indeed, there is so much, for the home consumption has been very moderate, whilst there has been a decline in the amount of our exports. If we look to the home trade we find that the requirements for the making of pig have not been so large as in previous years in the North of England, Scotland, the Midlands, Staffordshire, South Wales, &c. Taking South Wales, where a good deal of distress has prevailed for some time, there has been a great falling off during the last couple of years in the make of pig, and consequently in the consumption of fuel, whilst many of the rolling mills are entirely standing. For this unfortunate state of things there is no doubt the men are to some extent responsible. As an example, we find that so recently as 1872 Merthyr Tydfil was as prosperous a place as could be found, the Cyfarthfa works of Mr.

CRAWSHAY being then in full operation. He had then 9 furnaces in blast, 72 puddling furnaces, and 6 rolling mills going, as well as a large number of men employed at his collieries. The furnaces and mills are now standing, and the place once teeming with busy life is now desolate, the men whom the proprietor was so proud of and so familiar with having been alienated from him by the promises and speeches of demagogues. The men at Cyfarthfa found out their mistake when it was too late, as was shown by the application made to Mr. CRAWSHAY as to his resuming work, and the pithy and sorrowful letter he addressed to them. Several of the companies have been heavy losers during the year, and it would almost appear also as if the full extent of misfortune has not been realised in the southern part of the Principality.

The Nant-y-Glo and Blaina Company finding that they had lost seriously by their ironworks tried what could be done by attending to the collieries, and the result on the year's working has been a loss of nearly 45,000. With so much coal that could not be used for manufacturing purposes several of the colliery owners have been cultivating and extending their trade with the Metropolis, so that this year a much larger tonnage was sent there by railway than had ever been the case previously, the Great Western alone having taken upwards of 800,000 tons. At the present time, however, very many collieries are barely working half-time, whilst at Merthyr the miners are under notice, which will expire on Dec. 31. In the North of England there were considerable changes during the year. In June there was a strike, which for a time sent the trade into other districts. Despite this, however, business has been quiet, there having been a decrease in the tonnage exported to foreign countries, as well as the quantity sent by sea to the Metropolis, which was about 3,150,000 tons. It may be said that most firms have realised no profit whatever during the year, if, indeed, they have not been losers. Everything is in a depressed state, yet the men are on strike against a proposed reduction, which if not conceded will lead to the closing of many collieries, and an amount of distress that has not been experienced in the North of England for a number of years. The gross production of the mines in the counties of Northumberland and Durham for the year is estimated at 31,500,000 tons. The next field in importance, so far as relates to the yield, is Yorkshire, which in 1876 was credited with 15,055,275 tons of coal. Like most other districts, the West Riding has not been free from disputes or strikes on the part of the miners, who are admitted to be the best paid of any similar body in the kingdom. All things considered, they have been working very well, in the summer averaging fully four days a week, but it is not likely that the quantity raised during the year will exceed that of 1876. There has been a falling off in the tonnage sent from the Riding over the Great Northern to the Metropolis of about 60,000 tons as compared with the previous year, to some extent attributable to the carriage rate, although in March it was reduced 6d. per ton. Several new collieries were opened out to the coal during the year, which will increase the productive power of the West Riding by something like 1,750,000 tons per annum when they are in full operation, whilst others are being largely developed, and will also add extensively to the output during the ensuing year. Derbyshire and Notts form part of the same field, the Midland, which is continuous from Nottingham to Leeds, and the trade in those two counties has been anything but brisk, whilst a good deal of discontent has also prevailed. Derbyshire does the largest business with London of any county sending there by railway, and the year has been no exception to those that have preceded it. From Clay Cross there was sent upwards of 260,000 tons, but prices have ruled very low, and somewhat erratic.

In January the cost to consumers in the Metropolis was for Wallsend 28s., and Silkstones 25s. to 26s. per ton. In February there was a reduction of 1s. a ton, but in May there was a rise again in Wallsend to 28s. In June Wallsend were 25s., but in September they were 27s. and 28s. in October 29s., and in the first week in November the price came down to 27s., and continued so up to the end of the Christmas week. Several of the collieries in Derbyshire have been worked without profit, if not at a loss, so that some companies have been unable to pay any dividend. Several new collieries have been sunk, whilst the Industrial Coal and Iron Company (Limited) who worked the Hasland and Stortford Collieries, near Chesterfield, and who had also sunk a considerable distance down near Sheffield towards the Silkstone seam, have failed, the whole of the large capital having been entirely lost. Lancashire has been no exception to the rule which has prevailed in other districts, for trade has been dull, only occasionally relieved by a brief spasmodic reaction. As usual there have been strikes, and some explosions of fire-damp of a serious character, and the probability is that the output of coal for 1877 will not be much greater than it was in the previous years. The iron trade of South Staffordshire has been altogether very quiet, and this has affected the consumption of coal, for in former years the blast furnaces have absorbed at least one-eighth of the entire yield. Many pits have been kept but moderately going, and no change is expected when the New Year's work is commenced. South Staffordshire, it may be said, is an extensive feeder of the Birmingham Canal, which takes from it upwards of 3,200,000 tons in ordinary years for works in the mining districts through which it passes, as well as about 1,000,000 tons direct to Birmingham, but it is not expected that the return will be quite so favourable when they officially appear for 1877. Proceeding more to the west we reach the Forest of Dean, where the greatest depression as well as suffering has prevailed, principally in the western part of it. Ten years ago the annual output of coal in the Forest was 848,000 tons, now it will not be much more than 640,000 tons. This decline, of course, affects not only the miners but ironworkers, and those engaged in the tin-plate trade. Higher up the ironstone works at Frampton Cotterell have been stopped, whilst the blast-furnace at Ashton, near Bristol, is out owing to the slackness which has so long prevailed. In nearly every other district there are complaints as to the slackness which prevails, and at the unremunerative prices at which pig-iron and coal have to be sold. The falling off of the latter, owing to the diminished make of iron, has been most seriously felt, and is one of the leading causes of the depression in the coal trade, but which has been supplemented by the greater economy which is practised in our households, and to a slight extent by the decrease in our exports. With respect to the latter, there can be no mistake but what the German colliery owners are pushing us very hard, and will do so to a still greater extent, whilst France is doing all she can to develop her own minerals. This patent truth is not recognised by some who ought to be fully acquainted with it, for in a recent address by one of the best-known and noisiest of the miners' mob orators, whilst advocating the curtailing of the production of coal, he said—"I contend that we hold the control of the coal trade in Germany, France, and Belgium." Germany, it is true, has been our best customer, but this year there has been a falling off in the quantity she has taken from us of about 250,000 tons—a decrease of more than 15 per cent. for the year.

In Germany, too, since they commenced working coal there they have gone far ahead of us in the rate of production. If we take one field alone—that of Westphalia—we find there was raised in it in 1854 only 2,803,604 tons, whilst in 1876 the output had increased to 17,636,757 tons, being at the rate of more than 600 per cent. On the other side we find then in 1854 there was produced in the United Kingdom 64,661,401 tons, and in 1876 it had advanced to 133,344,766 tons—an increase not quite equal to 106½ per cent., or to put it in another way, it will be seen that in 1854 England raised nearly twenty-three times as much coal as Westphalia, and in 1876 it only raised a little more than seven and a half times as much; yet forsooth we are told—or rather the miners are—that we hold the control of the coal trade in Germany. Our exports this year with France have also declined in a marked manner, whilst we do very little with Belgium, which is an exporting country. This shows how reckless or ignorant some persons are who presume to speak with authority on a subject which there is no difficulty in obtaining the most accurate information. So far, however, as regards the coal trade of the country, no change for the better can be expected so long as there is such a very moderate demand for both pig and manufactured iron. Cheap coal, however, produces cheap iron, and it is from this circumstance that we must look forward hope-

fully to the much better demand for the one that will necessitate a greater increase in the consumption of the other.

ARMOUR PLATES FOR WAR VESSELS.

There is every probability that before long we shall see a revolution in the mode of plating our war vessels, and that iron by itself will be entirely discarded. The heaviest iron plates as yet rolled are, we believe, 22 in. thick, and were made for the Italian Government, for their monster turret ships—the *Diulio* and the *Dandolo*—but this thickness of iron would be easily penetrated by our 80-ton guns, but it is said that one of them is to be sheathed with 38-inch plates, which would be invulnerable against any known guns. Experience so far has shown that our heaviest guns can pierce 26 or 28 in. of solid iron, but there must be a limit to the thickness of plates if buoyancy and speed are to be taken into consideration, and hence it is that efforts have been made to introduce steel plates, or those made of steel welded on iron. Our best known makers of steel and iron plates have for some time past been trying to obtain an amalgam of the two that will have a greater resisting power in a given thickness than has hitherto been obtained from iron alone. So far as experiments have been made with heavy guns against armour plates the results have been in favour of the former, and we have no vessel afloat, even if we include the *Invincible*, with 24 in. of iron, that could stand against the 100-ton guns of Sir W. Armstrong, as manufactured by him for the Italian Government. This was shown by the experiments made last year at Spezzia, when the targets, consisting of 22 in. of metal, with about 29 in. of timber backing, and behind that a thin skin of metal, were penetrated by the 2000 lbs. projectile from the Armstrong gun. Steel plates were also tried, it appears, and they prevented the projectile from penetrating through the entire of the timber backing, although they were more shattered than the iron ones.

From this it has been assumed, and very fairly we think, that steel in connection with iron can be so constructed as to give a greater resisting power to heavy projectiles than iron alone, and at the same time considerably reducing the weight of the armour of the vessel, and so ensuring greater speed than can be expected from an armour-clad ship with 24 to 28 inches of iron solely. With the view of securing that object last year Mr. Wilson, the managing director of Cammell and Co., of the Cyclops Works, Sheffield, took out a patent for compound plates. In these the iron and steel are welded together, and the plates can be made to give an iron face and back, with steel in the middle, but he can also give a steel face to the iron itself, and the resisting power was found to be greater than that of the ordinary iron plates. The compound plates are simple in construction, for the steel in its fluid state is poured on to the iron plate, which has been raised to a welding heat; or where a central layer is required two iron plates are placed in a vertical position, and the molten steel is poured in between them. At the works of Sir J. Brown and Co., Sheffield, compound plates have also been made, whilst Sir J. Whitworth, of Manchester, has made some plates of compressed steel, which he considers are superior to those of iron, or steel and iron combined. Last week experiments were made at Portsmouth with the plates of steel and iron of Mr. Wilson, and with the ingeniously made plates of steel by Sir J. Whitworth, but, as is often the case with first experiments the plates do not appear to be all that could be desired; but sufficient was shown to cause our Government to pause before clothing any more of our war vessels with plates entirely made of wrought-iron. A series of experiments, we believe, will shortly be made, and after the experience of last week, limited as it was, we are certainly of opinion that steel plates, or a combination of steel and iron, will be found superior to those made of the latter material only.

RAILWAY IRON IN 1877.

The year through which we have been groping our way has now very nearly run its course, and before our next impression has seen the light we shall have entered upon 1878. At the close of every year the merchant takes stock in his business, and the journalist naturally takes stock also of the course of public affairs. Our attention being more particularly directed to coal, iron, copper, and tin, we are naturally disposed to ask, "What has been the course of the railway iron trade in 1877?" As regards home railways, the past year has not been a very eventful period. Traffics have not made much progress, but still they have held their own, and have even slightly expanded. Moreover, as coal, iron, and other materials used in railway working have somewhat declined in price, current expenses have been reduced; and as home railway credit has sensibly strengthened during the last six or seven years directors have been encouraged to proceed with duplications and sidings, to say nothing of extensions. So far, then, as the home railway world is concerned 1877 has probably been a tolerably good year as regards the demand for rails and accessories, but the weak feature in affairs has been the low price at which the rails sold have been disposed of. A similar remark applies to the exports of railway iron which have been effected this year. Thus the 456,037 tons of railway iron exported to November 30 this year were valued at only 3,562,132L, the 388,670 tons sent abroad in the corresponding period of 1876 being priced at 3,486,071L. It will be seen that while our exports of railway iron increased in the first eleven months to the extent of 69,387 tons the value of the exports was only augmented by the comparatively small sum of 76,042L. Although the cost of producing rails has been sensibly diminished by improvements in machinery, reductions in the price of coal, and economies in the important matter of labour, still the fall in selling prices has been so serious that the profits realised in 1877 from the manufacture of railway iron must have become sensibly smaller, although they were comparatively meagre in 1876. It is right, perhaps, to remark that the expression "railway iron" must be taken as implying generally steel as well as iron rails. Russia imported 79,986 tons of our railway iron in the first eleven months of 1877, and Australia 77,901 tons; but the proportion of steel rails imported by Russia having been somewhat larger, the value of the railway iron received by Russia to November 30 this year was 714,244L, while the corresponding value of the railway iron imported by Australia in the same period was 626,823L. The best external customers for our railway iron in the first eleven months of 1877 were Russia, Sweden, British India, and Australia, the total value of the exports made to each of these countries or colonies to November 30 this year having been as annexed:—Russia, 714,244L; Sweden, 409,275L; British India, 595,946L; and Australia, 626,823L. The value of the exports made to British America in the first eleven months of this year was 298,965L, but a total of 200,000L and upwards was not attained by any other country.

In dealing with 1877 we must act upon the principle of welcoming the coming as well as speeding the parting guest. We proceed, then, to make a few observations upon the prospects which 1878 presents for the producers of railway iron. As regards the American demand, it appears likely to be just as feeble in 1878 as it was in 1877, and as it was in 1876. The great trunk railroads of the United States have, probably, been brought into a somewhat stronger position by the advances which have been recently made in freight rates, but the railway interest of the United States has not yet fully recovered from the disastrous panic of 1873; and apart from this consideration, we must also bear in mind the fact that the heavy protective tariff imposed upon foreign iron entering the United States has virtually driven English iron from American markets. It appears probable that, as in 1877, so in 1878, the colonial demand for rails will be the mainstay of the British iron trade. With regard to this colonial demand, the outlook is certainly hopeful, as great vigour is being impressed on the work of Indian railway construction, while in Australia the railway engineer will not be idle.

LIQUEFACTION OF OXYGEN.—Students of chemistry will be interested by the following telegram from Prof. Pictet, of Geneva, which has been received by Prof. Tyndall:—"Oxygène liquide s'admet par acides sulfureux et carboniques combinés. Pression

320 atmosphères. Température 100° Centigrade de froid." Hitherto all attempts to liquify oxygen have failed.

DORMANT ENTERPRISE.—The dulness which has characterised joint-stock enterprise during the last three years remains as marked as ever. With the approach of a new year there are no indications of returning vitality, nor are there any signs of a restoration of that confidence on the part of investors the re-establishment of which is so much needed. Although there have been a number of concerns registered under the Limited Liability Acts, only a small proportion of these have advanced beyond that formal stage, and if the operation of the public has been sought the mode of seeking it has been private, if not altogether *sub rosa*. While, on the one hand, it is urged that joint-stock enterprise in any form is, for the nonce, distasteful to the public, it is also suggested that were the laws regulating the principle of limited liability simple and efficacious public attention would be permanently attracted in its direction, and enterprise of this kind would flourish as a bay tree. The Select Committee which undertook the investigation of the whole subject do not seem to have arrived at any very satisfactory conclusion upon the subject. Suggestions have been made, and will, doubtless be regarded, but after all we are left much as we were before. It seems to be admitted that under the existing law the lender or investor has not sufficient control over his capital, and also that his interests are but insufficiently protected. When man has lost his money he not unfrequently clamours for laws which shall protect his pocket as rigidly as his person. There has been an epidemic of this kind lately. In other departments of commerce and finance the cry of the pigeon praying to be delivered from the hawk has been heard, and the bird of prey has suffered severely when brought within the meshes of the legal net. In joint-stock enterprise, as in other financial operations, there are always to be found unprincipled persons willing and ready to take advantage of cupidity, and these schemers have, no doubt, found the Joint-Stock Acts elastic enough for their purpose, but for all that they have been materially assisted in their plans by the credulity and greed of their victims. Until the legal provisions of the Acts of 1862 and 1867 are rendered so clear that misconstruction is impossible, a state of things suggestive of Eutopia, roguery will continue to exist, and lawyers will constantly have employment. The real remedy, however, in our opinion lies more in the hands of the investors themselves. It is not by rejecting every project brought under their notice that they will benefit themselves, for this policy is peevish and child-like. It is by a careful and weighty consideration of the alleged facts by an inquiry into the antecedents of directors, and it is by an attention to detail of this kind that they are to be protected. Legislation may, and no doubt will, effect some useful minor changes, but it helps those best who help themselves. The falsehood and fraud which have led to the temporary collapse of a useful principle are to be regretted, but it is also a matter for concern that a system which is capable of being used with advantage to the community at large should languish and decay because of the chicanery practised in its name.

THE GLOBE ROCK DRILL.—In the Supplement to this day's Journal will be found some interesting particulars concerning the Globe Rock Drill (an improvement upon the Winchester drill) which has already proved itself to be the fastest drill in America, although this is the first publication in this country. The new drill, which is manufactured by the Globe Rock Drill and Motor Company of Boston, is only 22 in. in length, and its cylinder is but 4 in. diameter, yet it has been proved by experience that it will pierce hard flint rock with greater rapidity than the large tunnel drills at present in use. It delivers 1000 blows per minute, and it is not liable to get out of order or require to be laid up for repairs. The value of the Globe drill as compared with others in use will be seen from the map which accompanies the description, and shows that in speed the drill is without a rival.

COAL AND IRON IN THE UNITED STATES.—The pig-iron trade has ruled quiet at Pittsburg, Pennsylvania; the demand is not so active as it was a month since, and is confined principally to small lots. Prices are generally unchanged, but they are, if anything, rather weaker. The demand for all descriptions of manufactured iron at Pittsburg is not so active as it was a month since; most of the mills are, however, working double turn, many of them having fallen in arrear with their orders. A few recent failures which have taken place are largely attributed to the unremunerative prices which have prevailed. There has been fair demand for wrought-iron pipes at Pittsburg, although orders are not so plentiful as they were a month since. The steel market at Pittsburg has continued quiet, but there has been a fair degree of activity. Manufacturers are generally pretty well off for orders, but they complain very much of the scanty profits which present prices leave them. The demand for scrap iron has fallen off to some extent at Pittsburg. The production of anthracite coal in Pennsylvania to Nov. 24 this year was 18,285,735 tons, as compared with 16,717,099 tons in the corresponding period of 1876, showing an increase of 1,568,436 tons this year. The production of bituminous coal in Pennsylvania to Nov. 24 this year was 3,263,328 tons, as compared with 3,348,523 tons in the corresponding period of 1876.

REPORT FROM THE NORTH OF ENGLAND.

Dec. 27.—Although there has been an iron market held at Middlesbrough to-day—adjourned from Tuesday in consequence of Christmas—it has been little else than a formal affair, the attendance being extremely scanty, and the business very small. There is little or no disposition to do business now at any time, but at this holiday season such a feeling reduces commerce almost to zero. Most of the mills and forges are laid off this week, so that the production of iron will be much less than usual. Prices are nominally the same as those quoted a week ago, makers adhering firmly to 4ls. per ton No. 3, and other qualities in proportion. Merchants, however, are still able slightly to undersell makers, and are, therefore, more sought after by intending consumers. The quarterly returns of the board of arbitration in the manufactured iron trade up to the end of November have just been issued. They show that the total weight of iron invoiced during that time by the firms in connection with the board—representing 90 per cent. of all the iron manufacturers in the North—has only been 97,804 tons, as compared with 99,286 tons for the previous quarter. In ship-plates there has been a decline from 55,900 tons to 51,439 tons in production, and from 67,193, 4d. to 67,15s. 8d. in selling price. There has been an increase from 8897 tons to 9028 tons in rails, but a decline from 57,19s. 10d. to 57,15s. 3d. in selling price. Angles have increased from 14,718 tons to 16,797 tons, but the price has fallen from 67,7s. 11s. to 67,2s. 9d. There is also a trifling increase in the production of bars, which, however, have declined in price to the extent of 2s. 9d. per ton. The return just issued will amply justify the employers in the demand they have made for a further reduction of ironworkers' wages. That reduction will be considered during the next quarter, but no variation of the present rate can take place until the end of March. The mineral traffic receipts of the North-Eastern Railway for the week ending Saturday last show an increase of 118%, as compared with the corresponding week of 1876.

Although not yet issued, there is good reason to believe that the Cleveland ironmasters' returns for the year 1877 will show an increased production of pig-iron (probably to the extent of 60,000 tons), as compared with 1876. This increase has, however, been accompanied by the maintenance of an abnormally low and unremunerative range of prices, and makers generally have sustained considerable loss. There are now four fewer furnaces in blast than at this time last year, and it is probable that some other furnaces will soon be extinguished. The output of Cleveland iron ore will not differ much from that of last year, but it is noticeable that the output during the last six months of the year has been much less than that of the first six months, and some half-a-dozen large mines are now entirely idle.

Lead mining has been pursued very steadily during the year both in Durham and Northumberland. The output of the principal firms, such as W. B. Beaumont's and the London Lead Company,

will not vary much in comparison with last year; and as only one or two new adventurers have come into the field, the total production may be estimated at something like 25,000 tons. The London Lead Company, under the energetic management of Mr. Bainbridge, have added considerably to their power of production, and have introduced several notable improvements in the different processes.

The Durham Coal Trade has passed through a year of great trial and tribulation; more so, indeed, than the oldest coalowner can remember. Prices have fallen continuously throughout the year; until now the average of the whole at the pit's mouth will only be a fraction over 5s. per ton. Not only has there been considerable falling off in the local consumption, but the exports from the ports of the Tyne and Wear will be at least 1,000,000 tons less than those of last year. Happily the agreement arrived at as to a sliding scale has prevented a recurrence of feuds between coalowners and their men, and the latter continue to work at the minimum rate allowed by the scale. Some 20 collieries in Durham are altogether idle.

REPORT FROM CORNWALL.

Dec. 27.—In writing our review of the Western mining of 1876 we said—"We do not think the year has had a very seriously detrimental effect on the prospects of mining for the future, and December leaves us very nearly where January began." And we might say pretty much the same of 1877. In some respects it has been a worse year than its predecessor, but in others it has had its compensations, and we close the twelvemonth with a really brighter hope than we have long known. There does at length seem reason to hope that the turn in the tide so long looked for has come, and that the pinch of the foreign competitions is over. We have reason to believe, in fact, that in the desperate struggle which has been waged with Australia the "Old Country" has shown that she possesses superior "staying power"—to borrow a metaphor from the race course—while her competitor is gradually being winded. All we want now is that the supplies from abroad shall fall off, and then Cornish tin mines will soon recover a fair portion, though, perhaps, we can never again expect to see the days of the past. Well, if so, a steady prosperity is better than a fitful success, and if we can keep on the even tenor of our way there will be nothing to regret in the ups and downs of the time when Cornwall enjoyed a monopoly of production, for even then curiously enough the miners did not always have it their own way. We wish we could see the same prospects for the copper mines. These are more depressed at the present moment than they have been for years, and in their case we do not really know where to look for an indication of better days in store. It is all the worse, perhaps, that it is difficult to point to a special cause of interference in their case.

The mining interest has not had only its own special drawbacks to contend with in 1877. It has suffered, and suffered deeply, in common with all the great industries of the country, from the depression of trade which has brooded over Christendom so long. It has suffered, too, from the depressing influence of the war which has been raging in the East, and to which we may now venture to hope an end will speedily be put. There have been times when war has had a stimulating effect on the metal trades generally, and there were not wanting those who prophesied that the present war would have a beneficial influence upon the prospects of mining in the West in like manner. However, such has not been the case, and it is very evident that it is to the arts of peace—to the stimulation of manufactures and industry—that we have to look to create the large and steady demand, upon which alone prosperity can safely and surely be built.

In the matter of the tin standards we may repeat our remarks of last December: 1877 "has again disappointed expectations, and again does the end of the year leave us worse off than did its commencement." However, we attach very little importance to the last drop in the standard—or, rather, in the unofficial prices—and we assume that practically the year has ended very much where it began. In December, 1876, the standards were 71s. and 72s., but the current prices were somewhat under this, and 69s. and 70s. may be taken as about the figures with which the year commenced. And this is just the position at which the standards stood a few days ago, though now 4s. to 5s. lower prices are paid. From February onward to August there was a continual downward movement—steady, if slow—and in the latter month the standards were down as low as 60s. and 61s., figures that if long sustained would render all tin mining hopeless. Happily they were not long sustained. A rise came before the end of the month, and September and October followed the improvement up so vigorously that the slumbering spirit of speculation was awoke again, and in a few days the prices of the shares in leading tin mines doubled and trebled, and even made greater advance than that. The first week in November brought up the standards to 70s. and 71s., and since then there has been no reason to fear that the fluctuations which have taken place have been more than of the most temporary character. In the matter of immediate hope, therefore, 1877 does end better than did its predecessor.

The course of the copper standard does not give occasion for like encouraging reflections. During the first half of the year prices were fairly sustained, such as they were. At the first sale of the year the standard was 103s., and on Feb. 22 it touched its highest point—106s. 2s. It has not reached the 100s. since June, and in September fell to 86s. 18s. Fortunately, since then there has been some recovery, but it is really impossible at present prices for all the smelters have as usual come in for some hard words, and if their course of action is comprehensible by themselves outsiders are utterly unable to understand upon what principle it is based.

Arsenic and other matters of mining produce have shared in the depression, and contributed their quota to the low ebb of mining enterprise.

And yet in the matter of dividends 1877 has exhibited some improvement over 1876. In the latter year there were 13 dividend-paying mines, against 17 in 1875, and 19 in 1874. This year there are 15 dividend mines, and the total dividends, as given, are very considerably in excess—68,004/-, against 40,871/- We are by no means certain, however, that the amount set down as divided by the shareholders in Holmbush and Wheal Newton is correct—24,000/- for the adventurers in two mines which were not in the Dividend List in 1876 seems an enormous sum. However, that is what the total of the dividends declared per share on the nominal share capital in these concerns comes to. But even if we set them aside the dividends of 1877 are still substantially in excess of those of 1876, so that there has been some pecuniary proof given of the turn of the tide. The figures of the publicly announced dividends are:—

Mine.	Shares.	Per share.	Amount.
Dolcoath	4,296	£ 1 7 6	£ 5,907 0 0
Devon Great Consols.	10,240	0 5 0	2,560 0 0
East Pool	6,400	0 8 6	2,720 0 0
Glasgow Caradon	40,000	0 1 0	2,000 0 0
Holmbush	60,000	0 4 6	13,500 0 0
North Busy	444	1 0 0	444 0 0
Pend-an-drea	6,000	0 9 0	2,700 0 0
South Caradon	512	8 10 0	4,302 0 0
South Condurrow	6,123	0 16 0	4,898 0 0
Tincroft	6,000	0 10 0	3,000 0 0
West Chiverton	3,000	0 10 0	1,500 0 0
West Tolgus	512	7 10 0	3,840 0 0
Wheal Eliza	1,024	9 10 0	9,708 0 0
Wheal Prussia	6,000	0 1 0	300 0 0
Wheal Newton	25,000	0 8 6	10,625 0 0
			£68,004 0 0

We miss from this list Great Retallack, Gunnislake (Clitter), Marke Valley, and West Poldice, which declared dividends in 1876; and the only mines in Cornwall paying dividends at this moment which gave dividends in 1876 are Dolcoath, East Pool, Glasgow Caradon, South Caradon, South Condurrow, West Tolgus, and Wheal Eliza—seven only have thoroughly weathered the storm.

The calling list this year has been heavier than last. It includes

Cook's Kitchen, West Frances, South Carn Brea, Wheal Basset, Wheal Peever, West Seton, Killifret, Medlyn Moor, West Wheal Eliza, Prince of Wales, Lovell, Wheal Grenville, Unity Wood, Trebigh Consols, Treleigh Wood, South Wheal Crofty, Carn Brea, West Maria and Fortescue, Bedford United, Blue Hills, Wheal Russell, New Hendra, West Godolphin, Marke Valley, Pemberthy Croft, Providence, East Caradon, North Treskerby, Combmarin, Crebior, South Tolcarne, Gawton, Spearn Moor, South Francis, Wheal Lovell, Wheal Agar, Levant, Wheal Owles, Wheal Uny, and Bedford United.

However, in several instances the need for calls was only temporary, and some of the mines named have not only since then made good their positions, but have commenced to make handsome profits. Wheal Peever is one of the most notable examples, although with other mines it not only suffered severely at the commencement of the year from the flooding caused by the heavy rains, but was completely drowned out. And there are several mines, and among them a few of first importance, which have neither paid dividends nor made calls, but are making small profits on the actual working, which would very soon turn into dividends with a little better price for produce.

It is hardly necessary to say that 1877 has not been remarkable for the starting of new ventures. It has not, however, on the other hand seen the collapse of many old ones, and thus, so far as the number of mines is concerned, also the year closes just where it began. We have not yet before us the statistics of the ore raised, but there is every reason to believe that in this respect there was no falling off. Possibly in black tin there was an increase. Great Wheal Vor, after a gallant struggle, has succumbed, and two or three mines only around Helston now keep mining alive in that once famous centre. The glory of Trumpet also has departed, but there are hopes that East Lovell may once again turn up trumps. The greatest collapse has, however, been at New Consols, where the experiment of treating mixed ores in the wet way was being carried out on the most gigantic, and it was understood, on the most successful scale. The facts are not all before us, and perhaps never will be, but so far as they can be gleaned the real difficulties would seem to have been financial rather than practical. It is very unfortunate that the chemical system of dressing has always been weighed in this fashion whenever it has been tried in the West. However, the district has had its slice of luck in the extraordinary discovery of silver ores at Wheal Newton, of which, however, little has been heard of late.

If "the day is not far distant when in all well regulated mines hand boring will have become a thing of the past," as we said last year, 1877 cannot be said to have done very much to hasten it. The problem was solved in 1876 by the successful introduction of the Barrow borer at Dolcoath. The work of 1877 in this direction has been to show the excellent work of the percussion drill of the Diamond Rock-Boring Company at Carn Brea. But we are still without any means whatever of judging between the two machines. Either is better and cheaper than hand boring, and that is all we can say. Miners want to know which is best, and oddly enough when the trial of rock-borers took place in connection with the first exhibition of the Mining Institute the Beaumont was not represented, and the Barrow would not work; 1878 ought to produce some results. Not only will the Beaumont and Barrow be at work as before but the McLean at Roskear, and the Darlington at Wheal Agar, and by-and-bye probably the Ingorsoll, which did admirably both at the Mining Institute and the Polytechnic trials.

The annual exhibition of the Royal Cornwall Polytechnic Society was unusually good and successful, and the Cornwall Mining Institute, following in the wake of the older society, have had an exhibition of mining implements, &c., at Camborne, which also met with the most gratifying success. As we have said before, there is ample room for both, and the only result can be for the benefit of practical mining. The other county scientific associations have, as usual, been doing steady work—notably the Miners' Association; and in August the county was visited by a number of scientific gentlemen, who came West in connection with the meeting of the British Association at Plymouth. And, by the way, the question of the adaptability of the telephone to mining purposes was first solved shortly after the experiments at Wheal Eliza.

The clay trade has been very dull, and several of the works have been suspended, while a number of the labourers have been employed in breaking up waste land for cultivation. The strike of 1876 has left some results behind, but there has been no disturbance during 1877. Successful experiments have been made by the Messrs. Stocker with the view of introducing hydraulic machinery.

Considerable excitement was caused a few weeks since by the publication of a letter in a London paper by Miss A. W. Buckland, stating that the distress among the miners in Cornwall was of such a character as to call for outside help, like the Indian Famine. This led to Mr. T. S. Bolitho reassembling the old County Relief Committee, and to the appointment of sub-committees to enquire into the real condition of affairs in the different districts. These enquiries have shown that in Cornwall, as elsewhere, there is a great deal of distress, though not to the extent and of the special character at first stated. The funds in the hands of the Relief Committee will, therefore, be distributed, and through that committee it is clearly advisable to prevent imposition that all organised help should go.

We could not close this brief review of 1877 without reference to an unfortunate series of occurrences which have caused much ill feeling and have wrought considerable harm to Cornish mining. We allude to the Bassett, Tincroft, and Carn Brea financial revelations. But we do not intend to allude to them at any length. The lesson has been taught—and, we believe, has been learnt—that however good a man's motives may be, and no one can imagine that in either of these cases anything sinister was intended, no mine manager has a right in any way to deceive the adventurers as to the financial position of their property, or to keep back from them all information necessary to enable them rightly and thoroughly to understand the position of their property. We have said that the lesson has been learnt, and we have no fear that 1878 will in this respect repeat 1877.

REPORT FROM MONMOUTHSHIRE AND SOUTH WALES.

Dec. 28.—The distress prevailing in the district appears to intensify rather than abate, and sad tales are told of destitution. Local efforts are being made to help those who are suffering from the depression in trade. Sup kitchens have been opened, and other means to relieve the distressed have been resorted to; but still these efforts are insufficient to meet the case. At the local iron and steel works the same enhanced amount of activity is observable, but prices are so low that it is impossible almost to make a profit, and quotations for Welsh bars have declined to considerably more than over half of what they stood at in 1873. A year of unparalleled depression has just closed, and there appears to be no prospect, or at any rate any immediate one, of trade improving; and although this district will probably secure a fair share of orders for the home railways (for re-laying), which are expected shortly to be given out, the rate at which these will be taken will not, it is feared, be in advance of present prices. With the exception of the blast furnaces, the works are inactive at Victoria, near Ebbw Vale. At the steel-making establishments there is about the usual amount of work in hand. Of course the occurrence of the Christmas holidays has tended to reduce the trade this week, but not to any very great extent. Bars are in slow request for foreign exportation. The slight improvement in the tin plate trade continues, and is felt more in the western section of the district. There are no signs of a re-start at the works now so long closed in Monmouthshire.

There is no change of importance in the coal industry, but last week a little more activity was observable at some of the local pits. This, however, applies but to very few cases, and in one instance I could mention a colliery has been kept going only 17 days in the course of six weeks, and in the other only 13 days out of the month. Meetings have been held, and although the proceedings have not been published, it is evident that the masters are desirous of modifying the sliding scale arrangement. As a matter of fact, it is impossible in the face of present circumstances for employers to pay

even the minimum standard of wages now in force, and it is to be hoped the men will meet them in a conciliatory spirit, and consent to a reduction, which may be only temporary. The demand for steam qualities is up to about the recent average, but house qualities are in fair request, the weather being cold. A slight improvement has taken place in the patent fuel trade. Shipments have been rather larger during the last week or so, but the works are, as a rule, badly employed. The men at the Rhodyddefaid Colliery, Killay, Swansea, have resumed work, and those of the Cefn Jolien pit have adopted a similar course, the latter accepting a reduction of 7½ per cent.

The directors of Richards and Co. (Limited) have again recommended a satisfactory dividend. The report issued for the year ending Sept. 30 recommended a distribution at the rate of 10 per cent. per annum, and this in the face of the universal depression which has prevailed in trade. The directors congratulate the shareholders on this fact. The Llanharran Collieries have remained closed throughout the 12 months, but the other branches of the company's business have been vigorously prosecuted, and with profitable results. After providing for the dividend named a balance of £3000. remains to be carried forward.

REPORT FROM DERBYSHIRE AND YORKSHIRE.

Dec. 27.—To notice the state of trade in the whole or in any part of the Midland coal field, and of the ironworks connected with it, is entirely out of the question, for during the Christmas week little or nothing is done in the shape of work. Men may have been working short time for months, but somehow or other they appear to be able to get funds to keep the Christmas carnival or carousal. This is especially the case with the coal miners of Yorkshire and the hardware hands of Sheffield. The publicans, as a rule, are very kind to them, for they manage to get up sports during three or four days in the week to occupy them during daylight, after which they retire to the hosteries to discuss the sporting events they have witnessed, whether in the shape of a handicap footrace, pigeon shooting, knur and spell, or any other "little game" capable of creating excitement, or on which a few shillings can be betted. In Derbyshire the men have only at some few places been doing sufficient to make any provision for spending a week in idleness, and the luxuries peculiar to miners, but in South Yorkshire they have been better off as a rule, so that there has been a fair expenditure of money, although not equal to that of some previous years. The week, however, may be looked upon as all but a blank, so far as work and earnings are concerned. Next week, however, there will be a fair start, and with the change of the weather, with snow and frost instead of rain and mud, there ought to be a much better demand for house coal than there has been, for stocks will have been sunk considerably whilst the collier has been away from the pit, and Paterfamilias will think it necessary to see the state of his coal cellar. If it is at all low he will do well to have it replenished, for he is not likely to be able to purchase it below its present price of 24s. to 25s. a ton delivered. That price, however, is likely to go up consequent on so many collieries being closed in the Newcastle district, where the men do not show any disposition to accept the 12½ per cent. reduction. This, of course, will make it so much better for those districts where there are no disputes, and will, consequently, benefit both Derbyshire and South Yorkshire in particular.

During the greater part of the year nearly all the Sheffield branches were remarkably dull, and whilst many workmen were altogether idle, more were only working short time. The last quarter, however, inaugurated a better state of things, and before half of it had passed over some branches became really active, and left off so. This was the case with respect to the Bessemer establishments, which were scarcely ever busier than during November and December, and left off for the holidays with plenty of work in hand. Table and other cutlery was in more active request for our own as well as other markets, as were also other descriptions of steel goods peculiar to Sheffield. The new year will, consequently, open out more favourably than was expected a short time since in several departments. The heavier branches of trade, however, have been dull, and just at present there is no likelihood of any improvement taking place.

In South Yorkshire, where during a considerable part of 1877 strikes prevailed at the collieries in one place or another, the new year will open out favourably, and, it is expected, entirely free from all disputes. Trade, too, is likely to be better in consequence, and, owing to the strikes and complications in other mining districts, very little coal was sent away by railway during the early part of the week, the railway companies no doubt being more profitably employed in conveying excursionists and the good things that "Father Christmas" generally provides for his fortunate children in all parts of the kingdom. Now, however, the "black diamonds" will be again in the ascendant, seeing that stocks of merchants will have sensibly declined. The well known Oaks Colliery, near Barnsley, will be stopped for a fortnight, owing to the state of affairs at the Atlas Works, Sheffield (Sir J. Brown and Co.), where about 1000 ironworkers recently received notice, as well as repairs required at the steel works at Penistone. The colliery is the property of the company, who are the owners of the two works named. At the Dodworth Silkstone Colliery, Barnsley, where the men have been on strike 37 weeks, an arrangement has been come to through the intervention of Mr. Mundella, who acted for the men, with Mr. Whitworth on the other side. It was agreed that the men should resume work on the terms proposed by the owners some time since. The dispute at the Corton Wood Colliery, near to Wombwell, which has also lasted for some time, has been referred to arbitration, and it is expected it will be adjusted so as to allow of the men resuming work very shortly.

REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

Dec. 26.—The demand for coal of various kinds is somewhat better, but not nearly equal to the capabilities of the collieries, and thus far prices are barely remunerative. An effort has been made by some of the largest shareholders to convert the New British Iron Company into a limited liability company. They had a majority of shares, but not of personal votes, and to secure the latter they transferred portions of their shares to other persons. The directors refused to register the transfers, and the case was brought before the Vice-Chancellor on Dec. 18 and 19. His lordship thought the directors could not sustain their refusal to register the transfers, but reserved his final judgment until January 21. It is pleasant at this season of the year to notice the efforts recently made by employers and others to provide for the rational recreation and improvement of workmen. One of the most noticeable of these in this district is the establishment of a "British Workman Public House" at Brongygarth, near Chirk, by the Messrs. Barnes (Father and Son), who are among the principal proprietors of the Quinta Colliery. The house is used by the colliers from that, and also from the Reesgwyn, Brynkinalt, and Black Collieries. It is provided with newspapers, books, and material for games. It has a public room where concerts and lectures are given, and is provided with stabling for the accommodation of the teams frequenting the adjacent lime works.

In a recent popular lecture on geology, Mr. D. C. Davies, F.G.S., of Oswestry, made a suggestion that might be acted on to advantage in other colliery districts. Speaking to the lads and young men of the amount of time they had on their hands after they had left the pits, he said a portion of this might be well employed in the collection of the plant remains that lie in the rubbish heaps of the collieries, and as one or more different coal seams were worked at each colliery the characteristic plants of each seam through the whole series from bottom to top might be classified by those who understood them. Capt. and Mrs. J. R. Barnes at once offered a room for the arrangement of such a collection, but it remains to be seen if the suggestion will meet with any response. A similar club room is just going to be opened for the colliery and quarry men of Trefonen, south-west of Oswestry, chiefly through the exertions of the clergyman of the parish.

The Festiniog Narrow Gauge Railway has enjoyed great freedom from accidents since its construction, but on the 18th inst. David

Evans got jammed between two slate waggons and received injuries that caused his death. A new carriage with a radiating axle has been introduced on the North Wales Narrow Gauge Railway by which long carriages may travel around sharp curves with ease.

The Slate Trade keeps good. The stocks at the great railway slate depot of the London and North Western Railway at Mold Junction are low, and loading is going on.

When in writing of the Llanrwst district a fortnight ago I recommended the driving of the deep adit under the Pencaig Mines I did not know that that mine was being brought out under the auspices of the Bett-y-Coed Mine Company; I wish them success. Twenty years ago I saw good ribs of lead in the lodes of that mine at a shallow depth, and I have long been wishful to see the district proved in depth. It is not well to meddle in a dispute, but while referring to the Llanrwst district I may be allowed to express the opinion held among mining men there that, first, it is not well for mine brokers to cry up one set of mines shared by depreciating others; and, secondly, when mine promoters make very great promises that are very tardy of fulfilment they fairly lay themselves open to animadversion. In Salop the chief interest gathers about West Tankerville, and if the improvement that has taken place continues the success of the mine is secure.

Experiments with the telephone were made on Sunday week between Holyhead and Dublin. The instruments were connected with the cable, and the messages conveyed were heard intelligibly at either end. The distance, 47 miles, is the longest submarine length along which *telesounds* have as yet been conveyed. In Montgomery and Cardigan there is little to notice unless it be the dissatisfaction that is finding expression among the shareholders of the Great West Van.

REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

Dec. 27.—This week business at the collieries and the ironworks throughout South Staffordshire has been suspended on account of the Christmas holidays. And many of the collieries and ironworks will, in consequence of the difficulty of securing orders, remain closed longer than is usual. When business is begun again the demand for forge coal will show a falling off, for production at the mills and forges is being curtailed. The blast-furnaces have continued blowing during the week. The supply of pigs is much in excess of requirements.

Three finished iron works have been in definitely close this week. The two largest are the Shrubbery and the Swan Garden Works, in Wolverhampton, lately owned by Messrs. G. B. Thorneycroft and Co.; the other is the Crookhay Works at West Bromwich of Mr. H. O. Firmstone. The Shrubbery and Swan Garden Works combine in all 80 puddling-furnaces and 12 mills, and Mr. William Gibbs, mineral broker, of Wolverhampton, has become the legal purchaser. For whom, however, Mr. Gibbs is acting is at present a secret. Such a state of things as is here indicated has not been known in this district for many years, and the distress amongst the iron-workers is largely increased. The Bilston Brook Ironworks were to have been closed last Saturday, but some good orders having been secured they will be carried on.

A fact strikingly indicative that colliery concerns of even the very highest standing in South Staffordshire have not yet regained that public favour which they once enjoyed is afforded this week in connection with the Sandwell Park Colliery Company. The shares of this concern have sold since my last in one case at a premium of only 6d. 10s., and later on at only 6d. Holders remain at 6d. ½ premium, but sellers demand a further 1d. off. It will be remembered that almost the last transactions we recorded in these shares were at about 8d. premium. For a fortnight or so before this fall the shares had displayed no movement.

The opening up of the Walsall Wood Colliery continues with vigour. In the No. 2 shaft a depth of 585 yards has been sunk. The last 445 yards were got through in a year and two weeks, or a weekly average, including all stoppages, of 8½ yards. The rate of sinking for so long a period is stated to be without precedent in this if not in any district. The deep coal has been come upon at a depth of 545 yards. It is of excellent quality, and averages, without the roof coal, 5 ft. in thickness. Some 350 to 400 acres of this seam has been proved. The deep and shallow coals (the latter also about 5 ft. thick) are apart, as in the Brownhills and Cannock Chase district, being separated by about 15 yards of rock band and other strong measures. Sinking is not at present going on in No. 1 pit, but it will now be resumed without delay. The prospects of the company are officially declared to be excellent. The outlay so far, considering the magnitude of the undertaking, has been moderate; yet it may be noted that the 6d. paid shares of this colliery are quoted by holders at 2½ d.

The trade of North Staffordshire is without alteration. The Coal-masters Association has resolved to render the Longton masters pecuniary support in enforcing the 10 per cent. reduction in wages.

The existing trade depression is so great that the whole of the ironstone mines near Bedworth, the centre of the Warwickshire coal field, are closed. Vast stacks of ironstone are to be seen on some of the pit banks at Bedworth, and blast furnaces erected there a few years back at a cost of many thousands of pounds have been for some time and still are blown out. The effects of the depression are severe.

Mr. Henry Johnson, the engineer of the Sandwell Park Colliery, with a view to test the requirements of the trade, raised during last week no less than 4167 statute tons, and it is gratifying to learn that he has sold the whole of it, with the exception of a little slack. To raise so much in six days from any shaft in the thick coal district of South Staffordshire is unprecedented; but as the capability of the engines is far above this quantity, we shall probably hear of still better work hereafter.

TRADE OF THE TYNE AND WEAR.

Dec. 26.—There has been considerable activity in the Coal Trade at the Tyne Dock during the week—particularly gas and steam coals have been shipped largely, the steam coal trade having improved on the Tyne and Wear in consequence of the strike in Northumberland. The winter has now set in with great severity, and this will no doubt improve the demand for house coal, as no stocks are held of this coal. The demand for coke is pretty steady, but for manufacturing coal the demand is extremely flat, and as most of the large ironworks and foundries have been stopped for a fortnight's holiday this trade cannot improve for some time to come. The stoppage of blast-furnaces which is going on will still further have a tendency to depress the trade. A number of works are going on in Northumberland, employing about 4000 men. In Durham the works are, on the whole, fairly employed, and many of them are putting out large quantities of coal daily; this is especially the case when the plant and shafts are arranged with due regard to all modern appliances and improvements. Since the strike at Ryhope was settled the works have been carried on with renewed energy; for a number of years the output of coal has been great at this remarkable colliery, varying from 1600 tons to 2300 tons per day, but lately this quantity has been considerably exceeded—3000 tons and upwards having been raised per day. As there are only two shafts, and the depth to the seam is 300 fms., the quantity raised must be considered extraordinary. At Silksworth, which adjoins Ryhope, the plant is very similar, and depth of shafts, &c., to Ryhope, and here 1600 tons are raised per day, and this will be increased until the quantity reaches 3000 tons per day and upwards, the second larger winding-engine is now in course of erection, and the drum in connection with it is intended to be spiral of the most improved type. This drum enables the engineer to dispense with the cumbersome apparatus connected with balance-chains; this drum has been much improved of late, and it is considered to be as safe as the ordinary drum, while it is constructed on scientific principles, and acts so that the engine has only to lift the actual weight of coal the whole length of the shaft, the gradation of the drum balancing accurately the ropes and cages.

The strike of the miners at the Steam Coal Collieries—The Associated Steam Collieries in Northumberland—has now continued a week, and as arrangements have been made by the officials to secure

as much support as possible, it is probable that the strike will be of long duration. The number of men on strike is comparatively small—about 8000, or one-eighth of the total number of miners in the district, still a large sum will be required weekly to support them. The strike we hold to be a mistake, as the masters cannot compete with other coals owing to the excessive cost they have to meet in raising the coal, and they have good reason to be annoyed with the slow and uncertain action, and also the heavy cost of arbitration. When the last arbitration took place, with such extraordinary results, the information collected clearly established this position.

REPORT FROM THE FOREST OF DEAN.

Dec. 27.—The Coal and Iron Trades of the Forest are still in a very unsatisfactory state, the coal trade especially being very variable within limited circumstances, some weeks giving hope by some activity, and then in a few days' time growing comparatively slack, and in this fitful way it mocks the hopes and fears of the proprietors and working colliers. A few of the iron mines on the eastern side of the Forest are fairly employed, but furnace operations are limited as for some time past. The stock of pig-iron, however, is being considerably reduced, which must, of course, be accepted as a favourable symptom. The forge and tin-plate operations are also characterised by the fitfulness which applies to the local coal trade, and just now orders are said to be slack.

The late reported distress still continues, but means are being used to alleviate the sufferings of those thrown out of work by the stoppage of works, some hundreds being already put upon what are called relief works—i.e., road making and mending—and others are being supplied with partial necessities from extra subscriptions or from private benevolence. The "pinch" is extensive over the Forest, but much more severely in West Dean than elsewhere. The weather having become much colder will try the very poor extremely, and yet in thinking of the local trades, especially of the coal trade, the change in the temperature is a welcome one, as being likely to lead to increased activity. An improvement steady in its character, instead of being so variable and fitful, would be extremely welcome, but the future is hid from our ken.

STEAM-ENGINES FOR TRAMWAY CARS.

The object of the improvements invented by Mr. ROBERT HEDLEY, of the Isle of Dogs, is to produce an engine better adapted for use on tramway cars, by mounting the whole steam-power on a single pair of wheels, the advantage gained being the use of any size, but more especially driving wheels of a large diameter; there is thus little or no interference with the easy traction or movement of the wheels. The weight upon the rails will always be equal whether the apparatus be moving or stationary. The employment of large wheels enables the principal portion of dead weight to be carried towards their centres, while there being virtually but one axle or line of axle, the direction of such, in rounding curves, will always be that of a true radius to the centre of curves, and hence there will be no undue friction of the wheel flanges against the rails, flanges being central. He effects these improvements by slinging a vertical steam-boiler inside an annular ring, outside of which, and exactly opposite, are forged on, two studs or pins, the whole forming one piece and the one main axle. The wheels revolve loosely on said studs or pins, while the steam cylinders are attached to the outside or walls of the boiler. The crank shafts, feed water tanks, feed pumps, driver's platform, railings, &c., are carried on a framework attached to the boiler, and also through the intervention of springs and axle boxes to the one main axle of the apparatus.

The framework is extended so as to form an arm, which terminating in an eye swivels on a collar, stud, or pin secured to the underside of flooring of tram or other car, and thus this extension of frame forms at once a third point of support to the whole machine, and a drag bar to the cars or carriages, and permits great freedom for the whole moving power and cars, when coupled together, to accommodate themselves to the best possible positions when rounding curves. The steam power he applies to the wheels through the intervention of gearing, either cogged or frictional, and is thus enabled to drive his engines at a speed (say) from four to six times greater than that of the wheels; by this he gains a large degree of expansion, an easy method both of starting and stopping, and obviates all thumps and jerks on the rails. Owing to the high rate of speed at which he drives his engines he gains great expansion of steam, and which is thus so lowered that it escapes with but little if any noise, and it is still further reduced by passing it through the feed water tanks before finally conveying it to the hinder end of the cars through a pipe lying along the carriage roof and fitted with an air injector to quicken the fire-draft and still further condense the waste steam.

SAFETY-VALVES.—The invention of Mr. C. W. COLLINS, of Manchester, relates to safety-valves of the annular class, having external and internal lips or openings for the escape of the steam when applied to steam-boilers, and consists in constructing the moveable and stationary parts of the valve, commonly called the valve and seating, so that in proportion to the size a comparatively small area shall be exposed to the pressure of the steam, and an ample area opened for its escape. The moveable part of the valve is formed of one, two, or more narrow rings held together by ribs, each ring having at its bottom end two horizontal, angular, or curved edges or surfaces, one projecting below the other, and fitted to corresponding surfaces on the stationary or seating part of the valve, there being between the surfaces any required space for the escape of the steam when the valve is open. The narrow rings may be plain or solid, but he prefers them to have chambers open at the bottom to the steam. And in order (when desired) to have an area exposed to the steam as nearly equal as possible, whether the valve is open or shut, he makes the internal tops of the chamber about the same width as the distance between the outer sides of the edges or surfaces of the moveable part of the valve. These improved valves (according to the pressure at which the steam is to blow off) are weighted by dead weights or springs, lever weights or springs, or by any of the modes at present in use, but as the areas exposed to the steam are comparatively small in proportion to the diameters of the valves, the weights or pressures will be lessened in the same ratio, and it will be found that although the weights are comparatively light the steam can escape through passages having areas as large or larger than that of the pipe to which the valve is connected.

CLEANSING AND SEPARATING METALLIC ORES.—The improved machinery invented by Mr. A. H. MAURICE, of Aberystwith, has for its object the cleaning and separating of metallic ores, minerals, and metals from any associated or intermixed impurities, and consists of a cylindrical or conical-shaped tub or barrel, inside which a vertical spindle is made to revolve. Attached to the spindle at intervals from the bottom to the top are arms or vanes fixed radially and horizontally, extending to the side of the tub, and set at an angle of 45° or any other convenient angle to the perpendicular. A mixture of ore or other materials to be cleansed or separated, and a sufficient quantity of water, is introduced into the tub, and the spindle and vanes being made to rotate, the ore or other material is forced to mount from the lower part of each vane to the top edge, on reaching which it falls again behind the vane to its former level. In thus falling in water the particles of ores, minerals, and metals having a higher specific gravity than the associated impurities fall most rapidly, and by the continued action of the machine are worked down to the bottom of the tub; all the substances so arranged themselves in the order of their specific gravity, the heaviest being at the bottom and the lightest at the top of the tub. The whole of the charge in the tub is acted upon by the vanes at the same time, and when the operation is complete the impure and lighter matters are removed through suitable valves, and the heavier ores in the same manner. In gold-producing ores the finest particles of metal will be separated by the action of the machine, and the gold be brought into continual contact with mercury placed at the bottom of the tub, the resulting amalgam being removed through valves, and the overlying impurities being first drawn off.

COAL MINES REGULATION ACT, 1872.
EXAMINATION FOR MANAGERS' CERTIFICATES OF COMPETENCY.
DISTRICT UNDER THE CHARGE OF JAMES WILLIS, ESQ.,
H.M. INSPECTOR OF MINES.

NOTICE IS HEREBY GIVEN, that an EXAMINATION for MANAGERS' CERTIFICATES OF COMPETENCY, under the above-named Act, will be HELD on the 2nd and 3rd days of January, 1878, and CANDIDATES INTENDING TO PRESENT THEMSELVES at such Examination must, on or before the 29th day of December, notify such intention to the Secretary of the Board of the above-mentioned District, from whom all information as to particulars can be obtained.

By order of the Board,
 GEO. SOUTHERN, Secretary,
 17, Portland-terrace, Newcastle-on-Tyne.

N.B.—Persons who do not reside within the District are equally eligible for examination with those who do.

THE YORKSHIRE COLLEGE, LEEDS.

BY the liberality of the Worshipful the DRAPERS' COMPANY, B the COUNCIL are prepared to APPOINT an

INSTRUCTOR IN COAL MINING.

At the stipend of £100 per annum and half the Students' Fees. A portion only of the Instructor's time will be required. The fuller conditions and duties of the office may be learned from the Secretary.

Applications and testimonials must be received on or before January 18, 1878.

W. F. HUSBAND, Secretary.

Dec. 19, 1877.

BURBANK COLLEGE,
 BURBANK STREET,
 WEST HARTLEPOOL.

VACANCIES FOR THREE PUPILS AFTER CHRISTMAS.

THE INSTRUCTION given in the above Establishment (in addition to the usual Branches of Education for Mercantile, Commercial, and Professional Life) embraces the Studies of Practical Land Surveying, Leveling, Plotting, Planning, Enlarging and Reducing Plans by the Pantograph, and will also equip young gentlemen intending to become Architects, Mining and Civil Engineers, Land Agents, Land Surveyors, &c.

The best instruction will also be given in Latin and the Foreign Languages, the Piano-forte, Organ, &c.

N.B.—The Education given on all subjects will be thorough, and such as to expect the confidence and merit the esteem of Parents and Guardians committing their Sons to the care of the Principal.

Terms on application to the Principal, Burbank College, West Hartlepool.

SCOTT BROTHERS,
 NEWCASTLE-ON-TYNE,
 Agents to THE STEEL COMPANY OF SCOTLAND (LIMITED),

MANUFACTURERS OF

Steel Rails, Steel Ship and Boiler Plates, Steel Bars and Axles, Forgings, Castings, and Patent Machine-Moulded Spur Wheels and Pinions.

THE BUTTERLEY IRON COMPANY.

THE DARLINGTON IRON COMPANY (LIMITED).

Dealers in Pig-Iron, Manufactured Iron, &c.

R. J. WEIGHT,

ASSAYER,

BLACKSWARTH LEAD SMELTING AND DESILVERISING WORKS,
 BRISTOL
 (MESSRS. SHELDON, BUSH, AND P. S. CO.)

Correct Assays per return of post: 7s. 6d. each sample.

PORTAL ADDRESS:

ST. GEORGE, GLOUCESTERSHIRE, NEAR BRISTOL.

EMMENS AND CO. (LIMITED),
 MINING ENGINEERS AND MANUFACTURING CHEMISTS.

CHIEF OFFICE.

134, PALMERSTON BUILDINGS, BISHOPSGATE STREET, LONDON, E.C.
 MINING DEPARTMENT.—The Management of Mines undertaken, and Technical Reports and Surveys made.

CHEMICAL DEPARTMENT.—Ores, Minerals, Acids, Salts, Arsenic, Pigments, Dyes, &c., manufactured and dealt in.

JOHN L. M. FRASER,

BERSE COTTAGE, NEAR WREXHAM.
 Fourteen years at the Great Minera Mines.

MINES FAITHFULLY REPORTED ON, AND MINING ACCOUNTS CAREFULLY AUDITED.

Mr. E. JACKSON,

Associate of the Royal School of Mines.

ANALYST AND ASSAYER.

Assays or Complete Analyses made of Copper, Silver, Lead, Zinc, Tin, and other Ores.

ASSAYING TAUGHT.

106, QUEEN VICTORIA STREET, LONDON, E.C.

WM. W. KENRICK AND CO.
 CONTRACTORS.

ROCK BLASTING, SHAFT SINKING, TUNNELLING, MINING, &c., WITH DRILLING MACHINERY, HIGH-EXPLOSIVES, AND ELECTRICITY.—A SPECIALTY.

WORK SOLICITED AT HOME AND ABROAD.

(LONDON OFFICE),

8, VICTORIA CHAMBERS, WESTMINSTER.

W. F. LOWE, F.C.S.,

Associate of the Royal School of Mines.

ASSAYER AND ANALYTICAL CHEMIST

ASSAYS AND ANALYSES MADE OF ORES, FIRE-CLAYS,

LIMESTONES, &c.

ADDRESS.—ASSAY OFFICE, CHESTER.

Mr. J. H. COLLINS, F.G.S.,

PUBLIC ANALYST for the County of Cornwall and Borough of Penzance, YIELDS THE ANALYSIS of all articles of FOOD, DRINK, DRUGS, MINERALS, MANURES, SOILS, or COMMERCIAL PRODUCTS. Also the INSPECTION of MINERAL PROPERTIES.

Private Instruction given in Practical Chemistry, Mineralogy, or Geology. For terms, apply by letter, 57, Lemon-street, Truro.

MEXICO, NEW MEXICO, ARIZONA, UTAH, NEVADA,

AND CALIFORNIA.

F. M. F. CAZIN,

MINING AND CIVIL ENGINEER,

At BERNALLILLO, NEW MEXICO, U.S. OF AMERICA.

Has 24 years' experience in Mining and Smelting, and 10 years' experience in American Business and Law, offers his services at moderate charges for Reporting on Mining and other Property in any of the above-named States or Territories; gives correct, safe, and responsible advice as to securing full titles and possession; and, as to best mode of utilising the property, will assist in settling existing difficulties by compromise, and in disposing of developed mining property when held at real value; offers his assistance for securing undeveloped mining properties at home prices. As to care taken in reporting, reference is made to the *Mining Journal* Supplement, April 1, 1878, containing report on property of the Maxwell Land Grant and Railroad Company; as to technical standing, to the prominent men of the trade—compare *Mining Journal* of Aug. 30 and Nov. 31, 1872, and *New York Engineer and Mining Journal*, Feb. 28, 1874.

CAPTAIN ABRAHAM FRANCIS,
 MINING AGENT, ENGINEER, AND SURVEYOR
 GOGINAN, ABERYSTWYTH.

THE NEWCASTLE DAILY CHRONICLE
 (ESTABLISHED 1754.)
 THE DAILY CHRONICLE AND NORTHERN COUNTIES ADVERTISE
 Offices, Westgate-road, Newcastle-upon-Tyne; 50, Howard street, North
 Shields; 196 High-street, Sunderland.

FOR SALE, STEAM ENGINES, MINING MATERIALS, TIN LEAVINGS, &c., AT SPEAR'S MOOR MINE,
 ST. JUST-IN-PENWITH, CORNWALL.

M. BERRYMAN WILL OFFER FOR SALE, BY AUCTION,
 on the Mine, on Wednesday, the 9th January next, at Eleven o'clock
 A.M., ALL THE

MACHINERY AND MATERIALS

THESEON, CONSISTING OF

ONE 30 in. cylinder STAMPING ENGINE, with new nozzles, 2 bobs, 1 fly-wheel, 2 12-head stamps axles and lifters, and ONE good 10 ton BOILER.

ONE 26 in. cylinder PUMPING ENGINE, with balance bob, and ONE 9 ton BOILER.

ONE 24 in. cylinder WHIM ENGINE, with fly-wheel, whim cage, wrought-iron shaft, &c., and an excellent BOILER, 9 tons.

ONE 24 in. cylinder WHIM ENGINE, with whim cage, and ONE 4½ ton BOILER.

ONE shaft tackle; 4 10 ft. shives, with wrought iron arms; 4, 5, and 7 in. pumps, with poles and cases; a quantity of bridge rail iron; 2 pulverisers; 5 round bushes, with shafting and driving gear; 1 dry tube, 3 ft. diameter and 20 ft. long; iron train wagon, strapping plates, wood supports, staples and glands, wood roof trusses of different sizes; wrought and cast iron; 200 fathoms 3½ inch round iron wire rope; smiths' bellows, smiths' tools, &c. &c.

For further information, apply to Capt. JAMES BENNETTS, the Manager, on the Mine; Mr. EDWARD TRYTHALL, the Purser, Penzance; or to the Auctioneer, No. 28, Clarence street, Penzance.—Dated Dec. 17, 1877.

FOR SALE, VALUABLE MINING MACHINERY AND PLANT, IN
 UNY LELANT, CORNWALL.

M. A. BERRYMAN has been instructed to OFFER FOR
 SALE, BY PUBLIC AUCTION, on Tuesday, the 15th January next, at
 Eleven A.M., at the PROVIDENCE MINES, in Lots to suit the convenience of
 purchasers, ALL THE

MACHINERY, MATERIALS, &c.,

THESEON, CONSISTING OF

ONE 40 in. PUMPING ENGINE, 9 feet stroke, with TWO 11 ton BOILERS and FITTINGS.

ONE 30 in. STAMPING ENGINE, 9 feet and 8 feet stroke, with TWO BOILERS, 19 tons, 2 fly wheels and wrought-iron shafts, 2 stamping axles or 32 heads, with heads, lifters, &c.

ONE 23 in. WINDING ENGINE, double acting, 6 feet stroke, with TWO BOILERS, 10 tons and 8 tons, and whim cage.

ONE 20 in. MAN ENGINE, double acting, 6 feet stroke, 1 fly-wheel, 2 wrought-iron shafts, and ONE 8 ton BOILER and FITTINGS, balance bob, &c.

ONE heavy 10 feet diameter TOOTHWHEEL, with wrought-iron shaft, plumer blocks and brasses.

ONE 6 in. HORIZONTAL ENGINE, 20 inch stroke.

BALANCE BOB at engine, with connecting rod, &c., complete.

Shaft tackle, with 10 feet shives; 20 fms. 4 in. pumps; 60 fms. 5 in. pumps; 40 fms. 6 in. pumps; 40 fms. 7 in. pumps; 60 fms. 8 in. pumps; 60 fms. 9 in. pumps; and 20 fms. 15 in. pumps; windbore; H and dooper; pole cases; slack settings, &c., to match; 340 fms. of 5, 6, 7, and 8 in. main rods; balance bob, connecting rods and travelling wheels at man engine; strapping plates; six pulverisers; 3 tubes in dry; oil coker and water-wheel; a capital weighbridge (weighing up to 10 tons), and house; round bushes and gearing; machine and hand frames; sundry water-wheels, from 8 to 14 ft. diameter; steel wire rope; railroad iron; double-power crab winch; tin kives, tin chests, wood roofing, launders, 3 smiths' bellows, smiths' tools; miners' tools; 1 lathe (wood bed), and carpenters' tools; beam and scales, capstan rope, two good girdles, old wrought and cast iron; and numerous other articles in connection with working an extensive mine.

Further particulars contained in an inventory on the mine.

Also, the RICH TIN LEAVINGS throughout the mine, being the accumulation of many years, during the greater part of which this has been one of the largest tin-producing mines in the county.

For further information, apply to Capt. HOLLOW, the Manager, on the mine; EDWARD TRYTHALL, the Purser, Penzance; or to the Auctioneer, 28, Clarence street, Penzance.—Dated Dec. 21, 1877.

LANLEY COLLIERY, LLANTRISSANT.

IMPORTANT AND UNRESERVED SALE OF VALUABLE PLANT AND
 MACHINERY.

M. R. D. T. ALEXANDER has been favoured with instructions from the Lotus Iron Company (Limited), of Middlesbrough, TO SELL, BY AUCTION, at the above colliery, on Wednesday and Thursday, January 9th and 10th, 1878, the whole of the

VALUABLE PLANT AND MACHINERY

Used in sinking their pit at Llantrissant, comprising an excellent and nearly new PAIR OF VERTICAL WINDING ENGINES, with upright BOILER, drums, and pumping gear complete, by Westrey and Forrester, of Barrow-in-Furness; a very capital and nearly new MORTAR MILL, ROLLERS, and PAN, &c., with 7-horse power VERTICAL ENGINE and BOILER; "Universal" 7 in. STEAM PUMP, by Hayward Tyler, of London; punching and shearing machine, by John Cameron, of Manchester; new patent Guibal ventilating fan, 30 ft. diameter, 10 ft. wide, together with a vertical engine, fitted with expansion gear by the Grange Iron Company, of Durham, which has never been fitted together for use; Corishead boiler with galloway tubes, 16 ft. by 5 ft., by Westrey and Forrester; air compressing engine, fitted with two of Ball's patent rock drill 9 x 15, by Corishead; circular saw bench, by T. Robinson and Son, of Rochdale; 12 ft. bed sliding and surfacing gap lathe, by Lillingworth, of Leeds; three 18 x 22 in. ventilating fans, 50 coal trams, 2 ft. 7 in. guage, fitted with steel axles and wheels, about 35 tons of permanent and temporary rails, 75 and 35 lbs. to the yard, respectively; 1 ton of railway chairs, several sets of pumps, and piping of various sizes, wooden kibbles, iron sinkingbuckets and water bowkes, weighing-machines, screw and hydraulic lifting jacks, a large quantity of Davey's safety lamps, Hardy's patent steel picks and shafts, two sets of stocks, taps and dies, anvil, and blacksmiths' bellows and tools, double and single purchase cradles, by R. Mitchell, of Cardiff; pair of new timber wheels, three 2-yard tipping wagons, three tip carts, quantity of timber in baulk, about 6 tons of good pitwood, &c., &c., together with a general assortment of stores too numerous to mention.

Also a quantity of MINING INSTRUMENTS and the OFFICE FURNITURE, consisting of a Milner's safe, letter press and stand, deal desks, drawing boards, tables, chairs, fenders, &c.

Sale to commence each day at 11:30 A.M., being immediately after the arrival of the 10:45 A.M. train from Cardiff.

The Auctioneer desires to intimate that the plant and machinery is in every respect in good condition, the greater portion of it having never been used.

Purchasers will be enabled to load and send trucks to the works, which are in direct communication with all the railway systems.

Catalogues are being prepared, and in the interim full particulars may be obtained of the auctioneer.

76, St. Mary-street, Cardiff, Nov. 30th, 1877.

MINES IN IRELAND.

BONA FIDE CAPITALISTS may learn in what MINES to INVEST WITH SAFETY AND PROFIT on application to "Mining Engineer." First-class references given and required.

FOR SALE, BY PRIVATE TREATY, the LEASE of a GOOD CHINA-CLAY WORKS, near ST. AUSTELL, CORNWALL, now in full working order. Railway siding into the works. Satisfactory reasons given for disposal.

For further particulars, apply JAMES SAUNDERS, 84, Darlington-street, WOLVERHAMPTON.

FOR SALE, a 14-horse power PORTABLE STEAM ENGINE, with link motion reversing gear, also gear to wind and pump.

A 25-horse power PORTABLE.

An 18-horse power VERTICAL STEAM ENGINE, and a 9½ in. cylinder VERTICAL ENGINE and combined winding drum.

A 6-ft. PAN MORTAR MILL, VERTICAL ENGINE, and BOILER.

Apply to—
 BARROWS AND STEWART, ENGINEERS, BANBURY.

FOR SALE, at NEW PEMBROKE MINE, CORNWALL.

An excellent 80 in. cylinder PUMPING ENGINE, with FOUR good 12 ton BOILERS.

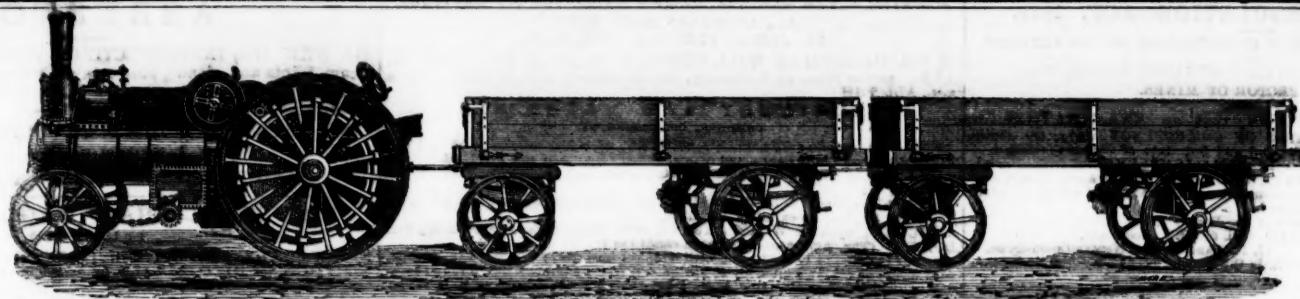
25 in. DRAWING ENGINE, and TWO BOILERS.

TWO SPARE BOILERS.

THREE IRON STAMPS AXLES.

100 fathoms FLAT RODS, 3½ in.

A quantity of ROD PLATES and other MATERIALS.



JOHN FOWLER AND CO.,
 STEAM PLOUGH WORKS, LEEDS, AND 71, CORNHILL, LONDON, E.C.,
 MAKERS OF ALL KINDS OF
 TRACTION ENGINES, ROAD LOCOMOTIVES, TRACTION WAGONS,
 AND
 STEAM PLOUGHING MACHINERY OF EVERY DESCRIPTION

MECHANICAL VENTILATION OF MINES.

THE UNION ENGINEERING COMPANY (C. SCHIELE AND CO.) undertake the Construction and Erection of their Colliery Ventilation Fans, of all sizes up to the largest required quantities of air. The leading features of their system are now generally known. Some of the specialties are: The absence of nec ssity for costly erections in masonry and brickwork; the small space required for the Machines, and the moderate first cost of the whole.

As the Fans are in a great measure self-contained, the necessary seats and connection with Pit are of a simple and inexpensive character. They can be arranged to be placed below ground when required, and also to work on

Drawing Shafts. Certain sizes are often used to assist in Furnaces, with good effect.

[Estimates and further information will be prepared on receipt of the necessary particulars].

FOR SINKING PURPOSES, and also for places where small quantities of air are needed for Ventilating purposes, a Special Fan is made, in various sizes, with small engine combined, complete, arranged for both forcing and exhausting air.

NOISELESS BLOWING FANS, for Smithy Fires, and other purposes.

TURBINE WATER-WHEELS, specially designed and adapted for use in Coal Mines, for high falls of water, for the purpose of developing water power, where it is available, for use in hauling, pumping, and other works.

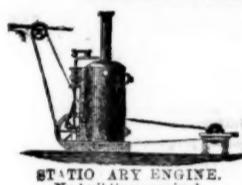
The Firm, having had an experience of nearly twenty-five years exclusively in the above Special Departments of Engineering, are prepared to advise on any matter affecting the application of Fans or Water Power in Collieries or elsewhere.

COAL-CUTTING MACHINERY, WINDING, HAULING, AND OTHER DESCRIPTIONS OF STEAM-ENGINES.

THE UNION ENGINEERING COMPANY (C. SCHIELE & CO.),
 PNEUMATIC AND HYDRAULIC ENGINEERS,
 (SOLE PROPRIETORS AND MAKERS OF SCHIELE'S LATEST PATENTS),

2. CLARENCE BUILDINGS, BOOTH STREET, MANCHESTER.

CHAPLIN'S PATENT PORTABLE STEAM ENGINES & BOILERS.



STATIONARY ENGINE.
 No building required.



HOISTING ENGINE.
 With or without jib.



STEAM CRANE.
 For Wharf or Rail.



CONTRACTORS'
 LOCOMOTIVE.



TRACTION AND
 ROADWAY ENGINE.



SHIPS' ENGINE
 AND DISTILLER.



PUMPING AND
 WINDING
 ENGINE.

The ORIGINAL combined Vertical Engines and Boilers, introduced by Mr. CHAPLIN in 1855, specially designed and adapted for

Pumping, Winding, Hoisting, Sawing, Driving Machinery, and for General Contractors' Work, Railway Sidings, Coal Mines, Quarries, Gas Works, &c.

WIMSHURST, HOLICK, & CO., ENGINEERS, 2, WALBROOK, LONDON, E.C.
 WORKS:—REGENT'S CANAL DOCK, 602, COMMERCIAL ROAD EAST, LONDON, E. (Near Stepney Station).

Parties are cautioned against using or purchasing Imitations or Infringements of these Patent Manufactures.

SOLID DRAWN BRASS BOILER TUBES

FOR LOCOMOTIVE AND MARINE BOILERS
 EITHER

MUNTZ'S OR GREEN'S PROCESS

MUNTZ'S METAL COMPANY (LIMITED),
 FRENCH WALLS,
 NEAR BIRMINGHAM.

RAILS FOR SALE.

Bridge Section, 10 to 25 lbs. per yard.

Flange Section, 16 to 70 lbs. per yard.

DH Section, 50, 60, to 70 lbs. per yard.

Steel Rails, 30, 36, 54, 58, to 66 lbs. per yard.

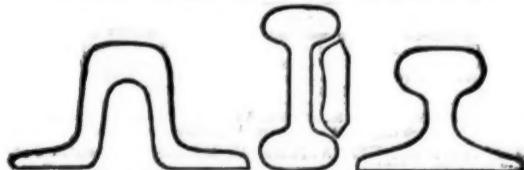
NEW PERFECT, NEW DEFECTIVE, AND SECONDHAND IN STOCK.

PERMANENT WAY RAILS, of all sections, made to order.

For sections and price, apply to—

ROBERT WRIGHTSON,
 NEWPORT, MON.

JOHN BEATSON, DERBY.



IRON AND STEEL RAILS, of all sections, from 10 to 82 lbs. per yard, new, defective, or second-hand.

POINTS AND CROSSINGS, FISH PLATES, BOLTS, NUTS, CHAIRS, AND SPIKES. LOCOMOTIVE ENGINES AND MACHINERY.

MALLEABLE AND PIG-IRON OF ALL KINDS.

Delivered at all Ports and Railway Stations in Great Britain.

A SECONDHAND SIX-WHEELED TANK LOCOMOTIVE FOR SALE.

ACCIDENTS BY FLOOD AND FIELD ACCIDENTS OF ALL KINDS.

May be provided against by a Policy of the RAILWAY PASSENGERS' ASSURANCE COMPANY.

THE OLDEST AND LARGEST ACCIDENTAL ASSURANCE COMPANY.

Hon. A. KINNAIRD, M.P., Chairman.

Subscribed capital, £1,000,000. Annual income, £205,000.

£1,120,000 have been paid as compensation.

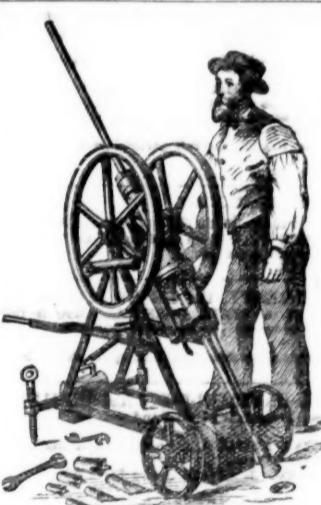
A fixed sum in case of death by accident, and weekly allowance in the event of injury, may be secured at moderate premiums.

Bonus allowed to insurers of five years' standing.

Apply to the Clerks at the Railway Stations, the Local Agents, or—

64, CORNHILL, LONDON.

WILLIAM J. VIAN, Secretary.



**PATENT
 HAND-POWER ROCK DRILL.**

IMMENSE SAVING OF TIME AND LABOUR.

STEAM POWER AND SKILLED LABOUR DISPENSED WITH.

PRICE COMPLETE, £50.

MOUNTED ON SUITABLE STANDS FOR SINKING, DRIVING, AND OPEN QUARRY WORK.

"TIMES," November 29th, 1877.

"Enough was done to demonstrate that the machine was well calculated to take its place in Mining and Quarrying Operations, and to successfully supersede for most purposes the slow and tedious process of hand-boring."

HAND-POWER ROCK DRILL COMPANY (LIMITED).

THOS. B. JORDAN, SON, & MEIHE,
 63, QUEEN VICTORIA STREET, LONDON, E.C.

**HENRY WATSON,
 HIGH BRIDGE WORKS, NEWCASTLE-ON-TYNE,**

MANUFACTURERS OF EVERY DESCRIPTION OF

MILL AND ENGINEERING FITTINGS,

FOR MARINE, STATIONARY, and LOCOMOTIVE ENGINES; COLLIERY PUMP WORKING BARRELS; FIRE ENGINES; SAFETY LAMPS; GUN METAL AND BRASS CASTINGS of any size; MALLEABLE BRONZE PRICKERS, and BLASTING APPLIANCES. Also,

Johnston's Patent Self-acting Alarm Whistles.

EXPLOSIONS FROM STEAM BOILERS have become so frequent, and are often attended with such serious results both to life and property, that any improvement tending to secure their safety cannot fail to be appreciated. From numerous examinations, made after explosions, by practical engineers, the great majority of accidents that occur are considered the result of a deficiency of water in the boilers. Experience has proved that it is good policy to furnish each boiler with this Self-acting Alarm, so constructed that, upon the water getting below a certain level, nothing can prevent the opening for the steam to act directly upon the instrument and cause the alarm.

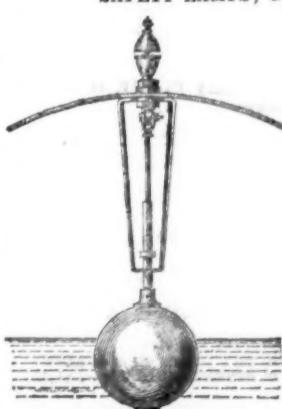
The hollow cast-iron float is made sufficiently heavy that, on falling with the water, it cannot fail in opening the orifice, as the apparatus is entirely free from all stuffing-boxes, glands, cocks, or any other contrivances which are so frequently found to operate against the proper action of alarms. The float is so constructed that it cannot become waterlogged. As long as there is a sufficiency of water in the boiler, the alarm valve is kept close against its seat by the float.

A loose pin at the top of the whistle enables anyone to test the alarm at a moment's notice.

Practical men consider this the best Alarm hitherto offered.

The Engraving shows the mode of fixing to boiler, also the water level. In ordering, the diameter of the boiler should be given, and also the diameter of the flue when there is one, also the distance from top of flue to top of boiler, or send sketch.

The use of these Alarms in large works, extending over a period of fifteen years, and numbering over 4000, is a guarantee in itself of their efficiency and safety.



NOBEL'S DYNAMITE

Is the MOST ECONOMICAL and POWERFUL EXPLOSIVE for every kind of MINING and QUARRYING OPERATIONS; for blasting in hard or soft, wet or dry ROCKS; for clearing land of TREE ROOTS and BOULDER STONES; for rending massive BLOCKS of METAL; for SUBAQUEOUS and TORPEDO purposes; and for recovering or clearing away of WRECKS, &c.

ITS SAFETY is evidenced by the total ABSENCE OF ACCIDENTS in transit and storage; it is insensible to heavy shocks its GIANT POWER being only fully developed when fired with a powerful percussion detonator, and hence its great safety.

As a SUBSTITUTE FOR GUNPOWDER its advantages are the GREAT SAVING OF LABOUR, rapidity and INCREASE OF WORK done, FEWER and smaller BORE-HOLES required, greater depth blasted, safety in use NO DANGER FROM TAMING, absence of smoke, unaffected by damp, &c.

For information, apply to the—

NOBEL'S EXPLOSIVES COMPANY (LIMITED), GLASGOW;

OR AT THE

London & Export Office, 85, GRACECHURCH STREET, LONDON, E.C.

WET GUN COTTON

Is perfectly uninflammable and insensible to the heaviest blows. It can only be fired in a bore-hole by using a special primer and detonator. Its strength is superior, weight for weight, to every known explosive, and it gives off no injurious taste or fumes.

Sold in cartridges ready for use in wet or dry ground at 1s. 6d. per lb.

PRIMERS AND DETONATORS SOLD SEPARATELY.

For further information apply to—

THE PATENT SAFETY GUN COTTON COMPANY, LIMITED,
STOWMARKET,

SOLE MANUFACTURERS OF ABEL'S GUN COTTON.

LONDON EXPORT OFFICE, 2, NEW BROAD STREET.

TONITE, OR COTTON POWDER.

THE SAFEST, STRONGEST, AND CHEAPEST OF ALL EXPLOSIVES.

Recommended to MINERS, PIT SINKERS, QUARRYMEN, and CONTRACTORS as the MOST EFFICIENT and ECONOMICAL BLASTING AGENT ever invented.

Results of practical experience show a saving of from 15 to 20 per cent. over the strongest explosives previously in use.

It saves labour in drilling holes, as a less number of holes are needed.

It does not require thawing, but is ready for use at all temperatures and in all climates.

It can also be advantageously used in breaking up boulders, extracting stumps, removing wrecks, exploding torpedoes, and for submarine purposes in general, as well as for signal lights and fog signals for ships.

OFFICES:

23, QUEEN ANNE'S GATE, LONDON, S.W.

WORKS: FAVERSHAM, KENT.

Agents: DINEEN, SON, and CO., LEEDS; JOHN RUSSELL, Whitehaven; R. J. CUNNACK, Helston, Cornwall; J. and W. SMITH, Chapel-en-le-Frith; W. VEITCH, Jedburgh, N.B.

THE DARLINGTON ROCK BORER.

No VALVE—BLOW obtained by the movement of the PISTON.

IN USE IN FRANCE, GERMANY, SPAIN, AND ELSEWHERE.

Rock Borers, Air Compressors, and Electric Blasting Apparatus.

Sole Agents and Manufacturers for France.—The Blanzy Mining Company,

WHERE BORERS MAY BE SEEN IN OPERATION.

For letter of introduction, particulars, &c., apply to—

JOHN DARLINGTON,

2, COLEMAN STREET BUILDINGS, MOORGATE STREET, LONDON.

THE TUCKINGMILL FOUNDRY COMPANY

(TUCKINGMILL FOUNDRY AND ROSEWORTHY HAMMER MILLS),

CAMBORNE, CORNWALL,
Engineers, Iron and Brass Founders, &c.,

MAKERS OF EVERY DESCRIPTION OF

MINING MACHINERY, SHOVELS, GEARWORK,
PUMPING, WINDING, AND STAMPING ENGINES.

ALSO OF

BLAKE'S STONE BREAKERS.

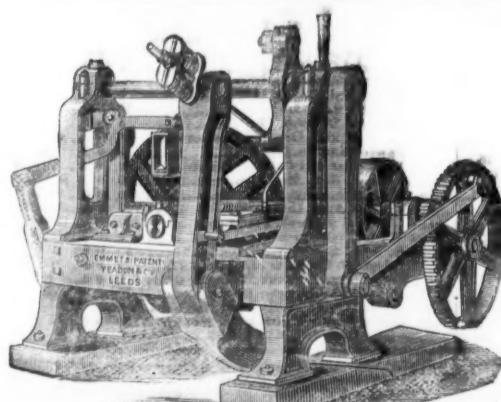
SOLE MAKERS OF

BORLASE'S PATENT ORE-DRESSING MACHINES AND PULVERISERS.

ESTIMATES GIVEN UPON INDENTS AND SPECIFICATIONS.

ILLUSTRATED CATALOGUES POST FREE ON APPLICATION.

LONDON OFFICE: 85, GRACECHURCH STREET, E.C.



E M M E T T'S A1 PATENT BRICK MACHINE

Massive; durable; cheap; takes little power, and gives
PERFECT SATISFACTION.

This is the ONLY Machine which presses the Brick equally on BOTH sides, each plunger entering the mould plate $\frac{1}{2}$ in., and turning out 12,000 SQUARE, SOLID, PRESSED Bricks per day, READY AT ONCE FOR THE KILN.

SOLE MAKERS—

YEADON AND CO.,
CROWN POINT FOUNDRY, LEEDS.
Makers of EVERY DESCRIPTION of Colliery and Brick Yard Plant.

London Agents—
HAUGHTON AND CO., No. 122, CANNON STREET, E.C.
Continental Agents—
PLAMBECK AND DARKIN, 171, QUEEN VICTORIA ST., E.C.

"Kainotomon" Rock Drill

SELECTED BY THE

BRITISH, PRUSSIAN, & SAXON
GOVERNMENTS.

SUPERIOR
Air-Compressors, Coal-
Cutters, Pumps, and all
Mining Machinery.



Secondhand ROCK DRILLS.
BRYDON AND DAVIDSONS
make £225 each new £232

T. A. WARRINGTON,
30, King-street, Cheapside,
LONDON E.C.

THE
PHOSPHOR BRONZE
COMPANY (LIMITED).

139, CANNON STREET, E.C.
LONDON.

Alloy, No. II., for pinions, ornamental castings, steam
fittings, &c. £120 per ton.
" No. IV., for pinions, pumps, valves, linings,
cylinders, &c. 130 .
" No. VI. (must be cast in chill) for bolts, &c. 140 .
" This alloy has very great tensile strength ... 140 .
" No. VII., for hydraulic pumps, valves, and
plungers, piston rings, bushes and bearings,
for steel shafts 140 .
" No. XI., special phosphor-bronze bearing metal,
wearing five times as long as gun metal 112 .
The prices of castings vary according to the pattern, the quantity required, and
the alloy used.

WIRE ROPES, TUBES OF ALL DESCRIPTIONS, &c.

CRAVEN AND SPEEDING BROS.,

MANUFACTURERS OF EVERY DESCRIPTION OF

WIRE AND HEMP ROPES

FOR
COLLIERIES, RAILWAYS AND SHIPPING, &c.

Charcoal and Steel Wire Ropes (Flat and Round), of best selected Charcoal and Steel Wire.

Guide Rods.

Galvanised Wire Signal Cord.

Galvanised and Plain Strand for Fencing.

Galvanised Wire Rope for Ships' Rigging.

Chains, Wire Rope Pulleys, Brattice Cloth, &c., &c.

Hemp Crab Ropes, of best selected Petersburg and Italian Hemp

Ditto Flat Ropes ditto ditto

Ditto Cordage ditto ditto

Manilla Rope, White and Tarred.

Flax Spun Yarn and Dressed Flax, for Packing.

Brown and White Spun Yarn.

Fine Dressed Petersburg and Italian Hemp, &c., &c.

Ships Rigging fitted to order. Estimates and special quotations supplied on application to

CRAYEN & SPEEDING BROS.,

Wear Hemp and Wire Rope Works,
SUNDERLAND.



By a special method of preparation, this leather is made solid, perfectly close in texture, and impermeable to water; it has, therefore, all the qualifications essential for pump buckets, and is the most durable material of which they can be made. It may be had of all dealers in leather, and of—

I. AND T. HEPBURN AND SONS,
TANNERS AND CURRIERS, LEATHER MILLBAND AND HOSE PIPE
MANUFACTURERS,

LONG LANE, SOUTHWARK, LONDON

Prize Medals, 1851, 1855, 1862, for
MILL BANDS, HOSE, and LEATHER FOR MACHINERY PURPOSES.

Second Edition. Just published, price 8s. 6d.
A NEW GUIDE TO THE IRON TRADE
OR, MILL MANAGERS' AND STOCK-TAKERS' ASSISTANT;
Comprising a Series of New and Comprehensive Tables, practically arranged to show at one view the Weight of Iron required to produce Boiler-plates, Sheet-Iron, and Flat, Square, and Round Bars, as well as Hoop or Strip Iron of any dimensions. To which is added a variety of Tables for the convenience of Merchants, including a Russian Table.

Batman's Hill Ironworks, Bradley, near Bilston.

OPINIONS OF THE PRESS.
"The Tables are plainly laid down, and the information desired can be instantaneously obtained."—Mining Journal.

"900 copies have been ordered in Wigan alone, and this is but a tithe of those to whom the book should command itself."—Wigan Examiner.

"The work is replete on the subject of underground management."—M. BANER
Colliery Proprietor.
To be had on application at the MINING JOURNAL Office, 26, Fleet street, London.

Just Published, Free Edition.
GUIDE TO HEALTH; or, ADVICE AND INSTRUCTIONS FOR
THE CURE OF NERVOUS DEBILITY.—A New Medical Work on the
Treatment of Local Debility, Consumption, Loss of Memory, Physical Depression,
Indigestion, and all diseases resulting from loss of nerve power. Illustrated with
cases and testimonials. Sent free for two stamps.—Dr. SMITH will, for the benefit
of country patients, on receiving a description of their case, send a confidential
letter of advice.
Address, Dr. H. SMITH, 8, Burton-crescent, London, W.C.

THE MINING SHARE LIST

BRITISH DIVIDEND MINES

Shares.	Mas.	Paid.	Last wk.	Clos. pr.	Total divs.	Lasted
1-00 Alderley Edge, c, Cheshire*	10 0 0	—	—	—	12 11 8	0 5 0 Jan. 1874
300-0 Sampfylde, c, i, ms., Devon*	1 0 0	—	—	—	0 2 0	0 2 0 June 1874
4000 Brookwood, c, Buckfastleigh	1 16 0	—	1	3 1	3 15 0	0 2 0 Nov. 1874
2000 Bryn Alyn*, i, Denbigh	10 0 0	—	—	—	0 7 0	0 7 0 Jan. 1874
3400 Cashwell, i, Cumberland*	2 10 0	—	2M	2 2 1/2	1 9 6	0 3 0 Aug. 1874
1000 Carr Brae, c, i, Illogan*	26 7 6	—	46	43 1/2 45	308 0 0	1 0 0 Feb. 1874
4500 Cook's Kitchen, t, Illogan*	24 4 9	—	3	2 2 1/2	11 17 0	0 7 0 Jan. 1874
10,420 Devon Gt. Consols, c, Tavistock*	1 0 0	—	3 1/2	3 3 1/2	118 15 0	0 5 0 July 1874
4500 Dolcoath, c, i, Camborne	10 14 10	—	35	33 35	112 1 3	0 5 0 Dec. 1874
8000 East Black Craig*, i, Scotland	5 0 0	—	—	—	0 10 0	0 10 0 Feb. 1874
400 East Darren, i, Cardiganshire	32 0 0	—	—	—	285 10 0	1 0 0 Aug. 1874
6 00 East Pool, t, Illogan	0 9 9	—	10 1/2	9 1/2 10	15 4 9	0 3 0 Dec. 1874
40 400 Glasgow Corp., c* (30,000 £1 p.), 10,000 15s. p.]-	14	—	1 1/2	—	0 12 10	0 0 0 Mar. 1874
7500 Gorsedd and Mevnia Cons., i, Flint 2 10 0	54	—	5 1/2	5 1/2	0 5 0	0 5 0 Aug. 1874
12,000 Great Dyliffe*, i, Montgomery	4 0 0	—	3	2 3	0 2 6	0 2 6 Apr. 1874
5,000 Great Laxey, i, Isle of Man*	4 0 0	—	22 1/2	21 23	22 13 0	0 10 0 Oct. 1874
615 Gt. Retallack, i, b4, Perranzabuloe	15 16 0	—	—	—	0 1 6	0 1 6 May 1874
25,000 Gr. W. Van., i, Cardigan*, pref.	2 0 0	—	36	3 1/2 36	0 2 0	0 1 0 Aug. 1874
4,000 Green Hurth, i, Durham	0 8 0	—	3	2 1/2 3	1 15 0 0	0 3 0 Aug. 1874
0,000 Grogwynion, i, Cardigan*	2 0 0	—	44	4 5	0 12 0	0 4 0 Feb. 1874
8,850 Gunnislake (Clitters), t, c	5 5 0	—	2 1/2	2 1/2 2 1/2	0 13 9	0 1 0 Oct. 1874
1,024 Herdoffoot, i, near Liskeard*	8 10 0	—	81	10 12 1/2	62 5 0	0 15 0 Oct. 1874
18,000 Hington Down, c, Calstock*	0 5 0	—	3	3 1/2	0 1 0	0 1 0 Nov. 1874
8,000 Holmabus, a, c, s-i, Callington*	1 0 0	—	1 1/2	1 1/2 1 1/2	0 4 6	0 0 6 Sept. 1874
2,800 Isle of Man, t, Isle of Man*	26 0 0	—	—	—	82 5 0	0 10 0 Feb. 1874
20,000 Leadhills*, i, Lanarkshire	6 0 0	—	4 1/2	4 1/2 4 1/2	12 0 0 0	0 6 0 Oct. 1874
4,000 Lislurane, i, Cardiganshire	18 13 0	—	75	70 75	584 10 0	1 0 0 Nov. 1874
14,000 Llanidloes*, i, Montgomery	3 0 0	—	14	34 1/2	0 9 0	0 4 6 Nov. 1874
8,120 Lovell, t, Wrendon	0 16 0	—	3 1/2	2 1/2 3 1/2	0 17 6 0	0 1 6 Jan. 1874
9,000 Marke Valley, c, Linkinhorne	5 3 6	—	7	3 1/2 7	7 15 0	0 2 0 Jan. 1874
9,000 Minera Mining Co., i, Wrexham*	5 0 0	—	18	16 18	67 8 2	0 3 0 Oct. 1874
20,000 Mining Co. of Ireland, c, i, c*	7 0 0	—	—	—	33 15 0	0 3 0 Jan. 1874
444 North Busy, c, Chacewater	3 9 6	—	5	4 5	1 10 0	0 1 0 July 1874
1,89 North Hendre, t, Wales	2 1 0	—	—	—	1 12 0	0 2 8 Aug. 1874
6,000 Pedn-an-drea Con., t, Redruth	0 8 6	—	7 1/2	7 1/2 7 1/2	0 9 0	0 9 0 June 1874
5,000 Penhalls, t, St. Agnes	3 2 6	—	3	3 1/2	3 13 6	0 2 0 July 1874
6,000 Penzant, i, b4, North Wales*	5 0 0	—	5	4 1/2 5 1/2	0 5 0	0 5 0 Mar. 1874
45,793 Penstruhul*, t, c, Gwennap	2 0 0	—	62	48 65	0 2 8	0 8 0 Nov. 1874
12,000 Phoenix, & W. Phoenix, t, c, Link*	5 7 3	—	8	4 1/2 5	2 9 6	0 4 0 Nov. 1874
4,000 Prince Patrick*, s-i, Holywell	1 0 0	—	24	13 24	0 14 0	1 3 Jan. 1874
10,000 Red Rock*, i, Cardigan	2 0 0	—	2 1/2	2 1/2	0 2 0	0 2 0 July 1874
4,000 Roman Gravels, Salop*	7 10 0	—	7 1/2	7 1/2 8	7 10 0	0 8 6 May 1874
512 South Cardon, c, St. Cleer	1 5 0	—	80	85 90 xd	741 10 0	2 0 0 Dec. 1874
4,123 South Condurrow, c, Camborne	5 5 6	—	9 1/2	9 9 1/2	2 18 0	0 6 0 Sept. 1874
12,000 St. Harmon*, i, Montgomery	3 8 0	—	3 1/2	3 1/2 2 1/2	0 6 0	0 3 0 July 1874
1,400 St. Pr. Patrick*, s-i, (500 sh. issued)	1 0 0	—	0	—	0 7 0	0 1 0 Dec. 1874
1,5000 Tankerville, t, Salop*	0 0 0	—	4	4 4 1/2	4 17 0	0 5 0 Dec. 1874
4,000 Tinctorf, c, t, Pool, Illogan	9 0 0	—	18	14 16	50 8 6	0 5 0 May 1874
15,000 Van, i, Llanidloes*	4 5 0	—	32	29 32	22 3 6	0 12 0 Oct. 1874
3,400 W. Chiverton, i, Perranzabuloe*	12 10 0	—	14	13 1/2 14 1/2	55 0 0	0 10 0 July 1874
1,783 West Poldice, St. Day	10 0 0	—	15	13 15	1 19 0	0 4 0 July 1874
512 West Toquie, c, Redruth	95 10 0	—	71	75 80	25 5 0	1 10 0 Dec. 1874
2048 West Whead Frances, t, Illogan	28 1 3	—	5	3 1/2 4 1/2	13 12 6	0 5 0 Oct. 1874
12,000 West Wye Valley*, i, Montgomery	3 0 0	—	4	3 1/2 4	0 12 0	0 3 0 Nov. 1874
1,024 Wh. Eliza Consols, t, St. Austell	18 0 0	—	—	—	15 10 0	1 10 0 Dec. 1874
2,042 Wh. Head, t, Kew	2 13 10	—	15	13 1/2 15 1/2	8 5 0	0 5 0 July 1874
2,094 Wh. Head Kitty, t, St. Agnes	5 4 6	—	2	2 1/2 2 1/2	11 19 6	0 2 6 Dec. 1874
25,000 Wh. Newton, a, c, s-i, Calstock*	1 0 0	—	5	5 1/2	0 8 6	0 4 0 Sept. 1874
8,000 Wh. Owles, t, St. Just	86 0 0	—	120	115 125	522 10 0	0 4 0 Aug. 1874
6,000 Wheat Prussia, t, Redruth	2 0 0	—	7	6 1/2 7	0 4 0	0 1 0 July 1874
9,000 Wicklow, c, s-i, Wicklow	2 10 0	—	2 1/2	5 1/2 6	52 9 0	0 2 6 Mar. 1874
10,000 Wye Valley, i, Montgomery*	3 0 0	—	2 1/2	2 3	0 10 6	0 4 6 Oct. 1874

FOREIGN DIVIDEND MINES

5550	Alamillos, <i>l.</i> , Spain*†	3	0	0	2	14	134	1	18	3	0	1	Oct.	1877
40000	Almada and Trito Consol., <i>s*</i> †	1	0	0	34	14	134	0	6	8	0	1	Oct.	May 1878
40000	Australian, <i>c.</i> , South Australia*†	7	0	0	2	14	2	0	19	6	0	1	Oct.	July 1877
10000	Battle Mountain, <i>c.</i> (6240 part pd.)	5	0	0	—	—	—	0	10	0	0	10	Nov.	1872
15000	Birdseye Creek, <i>g.</i> , California*†	4	0	0	—	—	—	0	14	0	0	2	June	1874
20000	Burra Burra*, <i>c.</i> , So. Australia*†	5	0	0	—	—	—	70	0	0	0	10	Oct.	1872
20000	Cape Copper Mining, <i>s.</i> So. Africa	1	0	0	34	31	33 xd.	29	12	6	0	17	6	Oct.
34430	Cedar Creek, <i>g.</i> , California*†	8	0	0	34	14	134	0	8	0	0	2	June	1873
30000	Cesena Sul. Co., Romagna, Italy*†	10	0	0	—	—	—	0	10	6	0	3	Aug.	1877
5000	Chicago, <i>s.</i> , Utah*†	10	0	0	24	2	24	2	8	0	0	4	Nov.	1876
50000	Colorado United, <i>s.</i> , Colorado*†	8	0	0	2	14	2	0	13	6	0	4	Jan.	1875
10000	Copiapo, <i>c.</i> Chile* (220 shares)	15	15	0	—	—	—	71	11	5	0	30	May	1877
100000	Don Pedro North del Rey*†	0	15	0	34	14	134	0	5	9	0	2	20	Mar.
23500	Eberhard & Aurora, <i>s.</i> , Nevada*†	10	0	0	84	84	84	1	8	0	0	30	Dec.	1876
70000	English & Australian, <i>c.</i> S. Aust.	2	10	0	14	14	134	2	15	9	0	1	Oct.	Mar. 1877
80000	Flagstaff, <i>s.</i> , Utah*†	10	0	0	14	5	14	4	20	0	0	5	July	1875
25000	Fortuna, <i>s.</i> , Spain*†	2	0	0	6	5	5	6	14	10	0	0	8	Oct.
55000	Frontino & Bolivia, <i>g.</i> , New Gran.*†	2	0	0	3	24	24	0	1	0	0	1	June	1876
30000	Gold Kun, <i>hyd.</i>	1	0	0	—	—	—	0	2	4	0	0	4	Oct.
55000	Kapunda Mining Co. Australia†	1	3	0	—	—	—	0	2	4	0	0	6	June
20000	Last Chance, <i>s.</i> Utah*†	5	0	0	—	54	54	0	14	0	0	2	July	1873
15000	Linares, <i>s.</i> , Spain*†	3	0	0	7	—	6 6 6	17	3	10	0	0	8	Oct.
45000	London and California, <i>s*</i> †	2	0	0	34	14	134	0	1	0	0	1	Oct.	July 1875
7837	Lusitanian, Portugal*† (25 sh.)	3	10	0	—	—	—	1	11	6	0	1	6	Mar.
54000	Mamm Copperopolis of Utah, <i>c.</i>	10	0	0	—	—	—	0	5	0	0	5	Oct.	1873
54000	Mountain Chief, <i>s.</i> , Utah*†	10	0	0	—	—	—	0	4	0	0	4	Oct.	Jan. 1878
10000	Fontibigard, <i>s.-l.</i> , France*†	20	0	0	26	24	26	25	8	0	0	11	0	Nov.
60000	Fort Phillip, <i>g.</i> , Clunes*†	1	0	0	54	14	134	1	9	0	0	1	Oct.	Sept. 1877
45000	Richmond Consols., <i>s.</i> , Nevada*†	5	0	0	84	84	84	3	15	6	0	7	6	Nov.
40000	Santa Barbara*, <i>g.</i> , Brazil	0	10	0	12	1	12	0	3	9	0	1	3	May
20000	Scottish Australian Mining Co.*†	1	0	0	14	14	134	0	15	per cent.	—	—	Nov.	1877
80000	Scottish Australian, Mining Co., New	0	5	0	59	59	59	0	15	per cent.	—	—	Nov.	1877
12500	Sierra Buttes, <i>g.</i> , California*†	2	0	0	14	14	134	1	18	0	0	2	Oct.	1877
60000	South Aurora, <i>s.</i> , Nevada*†	5	0	0	34	14	134	0	14	2	0	2	Oct.	1873
225000	St. John del Rey*† (25 stock + multiples)	5	0	0	—	—	—	300	310	—	0	30	pc. of	Dec. 1876
20000	Tolima, <i>g.</i> , So. America	5	0	0	—	—	—	0	11	6	0	8	6	May
20000	Victoria (London)*, <i>s.</i> , Australia	1	0	0	54	14	134	0	11	6	0	10	Aug.	1876
15000	Western Andes, <i>s.</i> , New Granada	5	0	0	11 14	10 14	11 14	0	12	0	0	12	1	July
21000	W. Prussian 55500 pref. sh. 10% pd.)	10	0	0	—	—	—	1	4	0	0	8	0	Angl. 1877

NON-DIVIDEND FOREIGN MINES

NON-DIVIDEND FOREIGN MINES.						
Shares.	Mines.	Paid.	Last Pr.	Clos. Pr.	Last Clos.	
5000	Anguilla, Phosphate, West Indies (4000 issued)	10 0 0	—	—	—	
12000	Argentine, g, Argentine Republic	5 0 0	... 3	2 3	Fully pd.	
30000	Beliavista, i, Peru* (10 shares)	10 0 0	—	—	Fully pd.	
90000	Blue Tent, <i>ayd.</i> , California	5 0 0	... 34	3 34	Fully pd.	
49535	Chontales, g, <i>s.</i> , Nicaragua*†	2 0 0	... 34	3 34	Fully pd.	
15000	Condes de Chile, <i>s.</i>	5 0 0	... 34	3 34	Fully pd.	
40000	Eng.ish Australian, g, Victoria*	1 0 0	... 3	2 3	Fully pd.	
55000	Excelior Hydraulic Gold Washing Co., California*	6 9 0	—	—	Dec. 1871	
40000	Escherich, g, <i>s.</i> , California*†	1 0 0	—	—	Fully pd.	
10000	Esquemba, g, <i>s.</i> , California	1 0 0	—	—	Fully pd.	
8000	Holcombe Valley, g, California	1 0 0	—	—	Fully pd.	
8000	Hornachos, <i>s.</i> , Spain	10 0 0	15	14 15	Fully pd.	
12000	Hultafall, <i>i, b.</i> , Orebro, Sweden	5 0 0	—	5	Fully pd.	
12000	Hunter Consolidated, <i>s.</i> , Utah	10 0 0	10 14	10 10 14	Fully pd.	
2000	Imperial Brazilian Collieries, Brazil*	8 0 0	—	—	Fully pd.	
90000	I. & L., g, <i>s.</i> , California*	1 0 0	—	34	Fully pd.	
50000	Javalli, g, Nicaragua*	2 0 0	—	34	Fully pd.	
2500	La Manche, <i>i</i> , Newfoundland	10 0 0	—	—	—	
12000	Lanestons, <i>i, s.</i> , Vizcaya, Spain (62 shares)	1 15 0	—	—	Fully pd.	
7500	Malabar, g, Colombia* (6718 issued)	1 0 0	—	34	Mar. 1876	
49000	Malpais, g, Colombia* (7490 pref. shares, fully paid)	1 0 0	—	34	Fully pd.	
10000	Menzenberg, <i>i</i> , Honesee, Germany*	8 5 0	—	34	Fully pd.	
4588	New Benoerig, <i>i, l.</i> , Germany	5 0 0	—	—	Fully pd.	
8000	New Queretada, <i>c.</i> , Venezuela*	5 0 0	—	—	Nov. 1876	
2000	New Zealand Kapanga, g, Coromandel*	5 0 0	—	2 24	Fully pd.	
3000	Oregon, <i>g, b.</i> , Oregon, U.S. (preference shares)	5 0 0	—	1 14	Fully pd.	
5000	Panulicid, <i>c.</i> , Chile*† (28000 debentures)	4 0 0	—	4 24	Fully pd.	
5000	Pestarena United, <i>g, l.</i> , Italy*†	4 0 0	—	1 14	Fully pd.	
5000	Providencia and New Rosario, <i>i</i> , Mexico*	3 0 0	—	34	Fully pd.	
9000	Rico, <i>g</i> , Colombia* (40000 issued)	1 0 0	—	—	Fully pd.	
121,100	Rio Pinto, <i>c</i> , Huévica, Spain	Stock	54	56 54	Fully pd.	
50000	Rossa Grande, <i>g</i> , Brazil* (21 shares)	0 19 0	—	56	July 1872	
50000	Russia Copper, Orenburg and Ufa*†	10 0 0	—	1 14	Fully pd.	
50000	San Pedro, <i>c</i> , Chile*†	2 0 0	—	34	Fully pd.	
50000	Silver Flume, <i>s.</i> , Colorado*	1 0 0	—	—	Fully pd.	
50000	Tecoma, <i>i</i> , Utah*	10 0 0	—	34	Fully pd.	
50000	Thornhill Reef, <i>g</i> , Australia*	1 0 0	—	34	Fully pd.	
50000	United Mexican, <i>i</i> , Mexico*†	28 15 3	—	13 24	May 1876	
50000	Utah, <i>g, b.</i> , Utah	5 0 0	—	—	Fully pd.	
50000	Yorke Peninsula, <i>s.</i> , South Australia	1 0 0	—	34	Fully pd.	
50000	Yorke Peninsula, <i>s.</i> , South Australia Preference	1 0 0	—	34	Fully pd.	

§ Have made calls since last dividend was paid

FOREIGN AND MISCELLANEOUS STOCKS, BONDS, LOANS, AND TIMBES.

FOREIGN AND DOMESTIC STOCKS, BONDS, LOANS, AND TRUSTS.		Closing Prices.	Closing Prices.	
Argentine, 1855, 5 per cent.	70	72	Foreign and Col. Gov. Trust, 6 p. c. t.	65 70
Bolivia, 6 per cent.	23	25	Do., 5 per cent., 2d issue	52 57
Brazilian, 1846, 5 per cent.	92	94	Do., 5 per cent., 3d issue	50 55
Chilian, 1866, 7 per cent.	104	106	Do., 1872, 4th issue	44 49
City of Providence, 5 p.c. coupon bonds	100	102	Do., 1873, 5th issue	46 51
Egyptian, 5 per cent. pref.	53 1/2	54	Peruvian, 1870, 6 per cent.	11 12
Do., unlined debt, scrip	23 1/2	34	Do., 1872, 5 per cent.	10 10 1/2
Do., 1 per cent., V. M. L.	67	69	Russian, 5 1/2 per cent., L. Mort.	—
Do., 2 per cent., year.	70	72	Spanish, Quicksaliver Mort., 5 p. c. t.	95 97
Do., 7 per cent., K. M. L.	63	64	United States Mort.	—

NON-DIVIDEND MINES.

Shares a.	Minas.	Paid.	Last wk.	Clos.	pr
40000 Aberdaunant, <i>4</i> , Llanidloes*	1 0 0.	—	—	...
10000 Aberystwyth, <i>4-1</i> , Cardigan	5 0 0.	—	—	...
20 40000 Abergavenny, <i>4</i> , Monmouth	100 0 0.	100	100	100

IRON AND COAL COMPANIES

<i>Shares.</i>	<i>Company.</i>	<i>Paid.</i>
100	Abbott, John, and Co. [L.]	75 0 0.. 9
15	Albion Steel and Wire Co. [L.]	14 0 0.. 1
5	Altamit Colliery Co. [L.]	5 0 0.. 1
100	Ashbury Co. [L.]	90 0 0.. 55
10	Bagnall, John, and Sons [L.]	10 0 0.. 7
10	Benhar Coal Co. [L.]	10 0 0.. 1
50	Bilbao Iron Ore Co. [L.]	40 0 0.. 19
10	Bilson & Crump Metallo-Weld Co. [L.]	10 0 0..
4	Blaen Cwmbach Coal Co. [L.]	4 0 0..
50	Blaenavon Iron and Steel Co. [L.]	50 0 0..
100	Bolckow, Vaughan, and Co. [L.]	50 0 0.. 3
50	Bowling Iron Co. [L.]	50 0 0..
50	Britannia Ironworks [L.]	25 0 0..
50	Brown, Bailey, and Dixon [L.]	50 0 0.. 18
100	Brown, John, and Co. [L.]	70 0 0.. 11
5	Cakemore Colliery Co. [L.]	5 0 0.. 3
100	Cammell and Co. [L.]	6 0 0.. 2
20	Cannock and Huntington Coal [L.]	6 0 0.. 2
10	Cardiff & Swansea St. Coal Co. [L.]	8 10 0.. 3
10	Cardigan Steel and Wire Co. [L.]	10 0 0..
10	Central Swedish Iron and Steel [L.]	10 0 0..
5	Chapel House Colliery	5 0 0.. 2
5	Charlton Iron Co. [L.]	50 0 0.. 12
10	Chatterley Iron Co. [L.]	45 0 0.. 38
10	Chillington Iron Co. [L.]	10 0 0.. 7
10	Clee Hill Colliery Co. [L.]	1 0 0..
10	Consett Iron Co. [L.]	7 10 0.. 11
50	Consett Spanish Ore [L.]	1 0 0.. 3
50	Cooke, William, and Co. [L.]	40 0 0.. 33
20	Darlington Iron Co. [L.]	12 10 0.. 39
50	Davy Brothers [L.]	22 10 0.. 34
5	Diamond Fuel Co. [L.]	5 0 0.. 5
100	Ebbw Vale Co. [L.]	29 0 0.. 23
20	Fox, Samuel, and Co. [L.]	80 0 0.. 25
10	General Mining Ass. [L.]	9 0 0.. 2
20	Great Western Coal Co. [L.]	17 0 0.. 2
5	Gwynnyllion Colliery Co. [L.]	3 0 0..
15	Hopkins, Gilkes, and Co. [L.]	11 0 0.. 73
50	Knowles, Andrew, and Sons [L.]	17 0 0.. 14
10	Lilay Hall Coal, Iron, & Firebrick [L.]	10 0 0.. 4
5	Littledean Woodside Coli. Co. [L.]	5 0 0.. 2
50	Llynni, Ogmore, & Tondu Co. [L.]	50 0 0.. 7
10	Lynddyne and Wigpenn Iron Ore [L.]	8 0 0.. 15
10	Marbella Iron Ore Co. [L.]	10 0 0.. 75
6	Mersey Steel and Iron Co. [L.]	5 0 0..
10	Midland Iron Co. [L.]	5 0 0.. 3
5	Mold Arged Colliery Co. [L.]	5 0 0.. 3
10	Monkland Iron and Coal Co. [L.]	10 0 0.. 73
4	Mwynwyd Iron Ore [L.]	3 10 0..
1	Nant-y-Glo and Blaenau (8 p. c. pref.)	100 0 0.. 17
3	Nerburda Coal and Iron [L. & Red.]	2 0 0.. 1
20	New Sharston Collieries [L.]	20 0 0.. 16
10	Newport Abercarn Coal Co. [L.]	10 0 0.. 4
10	Northmpton Coal, Iron & Wagon [L.]	8 0 0..
10	Northfield Iron Co. [L.]	8 0 0.. 314
1	Norton Green Coal Co. [L.]	1 0 0..
35	Palmer's Shipbuilding and Iron [L.]	26 0 0.. 15
100	Parkgate Iron Co. [L.]	65 0 0.. 10
20	Patent Nut and Bolt Co. [L.]	14 0 0.. 614
20	Patent Shaft and Axletree [L.]	10 0 0.. 4
20	Pelsall Coal and Iron [L.]	18 0 0.. 1214
50	Phoenix Bessemer Co. [L.]	40 0 0..
1	Rhymney Iron Co. [L.]	50 0 0.. 22
10	Richards and Co. [L.]	10 0 0..
100	Sandwell Park Colliery Co. [L.]	100 0 0..
50	Ditto New	10 0 0.. 1814
50	Shorts Iron Co. [L.]	50 0 0.. 45
100	Shearbridge Iron and Coal [L.]	55 0 0.. 10
50	Silkstone & Dodworth Cl. & Iron [L.]	27 0 0..
20	Skerne Ironworks [L.]	30 0 0.. 1414
50	Somerset Iron Co. [L.]	50 0 0..
25	South Wales Coal Co. [L.]	21 0 0.. 614
10	Staveley Iron and Coal Co. [L.]	60 0 0.. 25
10	Ditto ditto New	10 0 0.. 4
10	Swanson Valley Steam Coll. Co. [L.]	5 0 0..
10	Thames Iron Company	100 0 0..
50	Tredegar Iron and Coal Co. [L.]	20 0 0.. 11
5	Ditto B. shares	25 0 0.. 21
100	Ulverston Mining Co. [L.]	12 0 0.. 5
100	Vancouver Coal [L.]	5 0 0.. 15
100	Vickers, Sons, & Co. [L.]	100 0 0.. 24
50	Welsh Ironworks Co. [L.]	50 0 0..
25	W. Cumberland Iron and Steel [L.]	20 0 0.. 1214
10	West Mostyn Coal [L.] (12 p. c. pref.)	5 0 0..
5	West Swanson Colliery Co. [L.]	5 0 0..
100	Whitehaven Iron Co. [L.]	10 0 0.. 19
100	Wigan and Whiston Coal Co. [L.]	70 0 0..
100	Wigan Coal and Iron Co. [L.]	75 0 0..

WAGON COMPANIES

10	Birmingham Wagon Co. [L.]	10	0	0	19
10	Ditto, 2nd issue	4	0	0	34
10	Ditto, pref., 6 per cent.	10	0	0	12
20	British Wagon Co. [L.]	10	0	0	par
10	Gloucester [L.]	10	0	0	par
10	Ditto, 5th issue	5	0	0	34
10	Met. Rail. Car. and Wagon Co. [L.]	6	0	0	12
5	Ditto, pref., 6 per cent.	5	0	0	6
10	Midland	10	0	0	64
20	North Central Wagon Co.	20	0	0	274
5	Rail. Car. [L.] (Oldbury)	5	0	0	6
5	Ditto, pref., 6 per cent.	5	0	0	5
20	Sheffield Wagon Co. [L.]	15	0	0	34
10	Yorkshire Wagon Co. [L.]	10	0	0	44

— 1 —

MISCELLANEOUS.					
k. Atlantic and Great Western Leased Lines, Rental Trust	100	0	0	87	
25 Australian Agricultural	21	10	0	93	
25 Austral. Mort. Land and Finance [L.]	5	0	0	43	
10 Avondale Engine [L.]	7	0	0	5	
tk. Baltimore and Ohio, 6 per cent.	100	0	0	104	
10 Brighton Aquarium [L.]	10	0	0	104	
tk. Cent. of New Jersey Con. Mort.	100	0	0	65	
tk. Cent. Pacific of Calif., 1st Mort. 6 p.c.	100	0	0	104	
25 City of London Real Property [L.]	12	0	0	15	
5 Diamond Rock Boring	4	10	0	23	
15 English and Foreign Credit	8	0	0		
16 Fore Street Warehouse [L.]	14	0	0	9	
16 Foster, Porter, and Co. [L.]	10	10	0	10	
Gen. Phon. & Chem. Works Co. [L.]	5	0	0		
1 Greenhill [L.]	1	0	0	1	
5 Kit Hill Tunnel [L.]	1	0	0	1	
17 Hudson Bay Company	17	0	0	104	
10 Huntington Copper and Sul. Co. ...	9	0	0	84	
k. Illinois Central, \$100 shares	100	0	0	73	
k. Illinois & St. Louis Bridge, 1st Mort.	100	0	0	93	
k. Ditto, 2nd Mort., 7 per cent.	100	0	0	53	
k. Illinois Cent. Sinking Fund, 5 p. cent.	100	0	0	95	
Ditto, 6 per cent.	100	0	0	107	1
1/2 Imperial Credit [L.]	7	10	0	74	
Ditto, Surplus Certificate				55	
k. Leigh Val. Con. Mort., 6. p. cent.	100	0	0	97	
10 Milner's Safe [L.]	19	0	0	74	
22 National Discount [L.]	5	0	0	9	
tk. N. Cent. Rail. Con. Mort., 6 per cent.	10	0	0	83	
10 Pawson and Co. [L.]	2	0	0	3	
50 Peninsular and Oriental Steam ...	50	0	0		
k. Penny. Gen. Mort. 6 p. cent., 1910.	100	0	0	106	
k. Ditto, Con. Sink. Fund, 6 p. ct., 1905	100	0	0	94	
Scotlisch Aust. Investment Company	100	0	0	180	
Ditto, 6 per cent. Preference	100	0	0	120	
10 Silber Light (ord. sh.)	10	0	0		
20 Suez Canal shares	20	0	0		
12 Telegraph Construc. & Maint. [L.]	12	0	0	27	
8 Ditto, Second Bonus Three per Cents	8	0	0	39	
10 Tharsis Sulphur and Copper Co. ...	10	0	0	20	
tk. Union Pacific Land Grant, 1st Mort.	100	0	0	103	
tk. Union Pacific Railway, 1st Mort. ...	100	0	0	103	

London: Printed by RICHARD MIDDLETON, and published by HENRY ENGLISH (the proprietors), at their office, 26, FLEET STREET, E.C. where all communications are requested to be addressed December 29 1877.